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Ames Rubber Company, Hamburg, New Jersey makes the platen for Calculagraph Company, Harrison, New Jersey. B. F. Goodrich Chemical Company manufactures the Hycar American rubber only.

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There are many good reasons why the manufacturer selected Hycar American rubber for the printing platen. The platen needed to be soft enough to "give" under the impression, yet hard enough for a clear print. It had to be springy so no permanent impressions remained. And most important it could not swell or be attacked by the solvents in the ink. The manufacturer found that Hycar gave the exact combination of properties required.

Hycar American rubber has exceptional resistance to abrasion, oil, gas, heat and cold, as well as many chemicals. Throughout industry Hycar has solved many problems and improved many operations. It may supply the answer to your own product problems. Please write Dept. EP-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
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230

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a case of joint

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Drill pipe protectors are another example of how the extra oil-resistance and extra processability of CHEMIGUM have materially improved a product. How can they help yours? For details and the latest Tech Book Bulletin, write:

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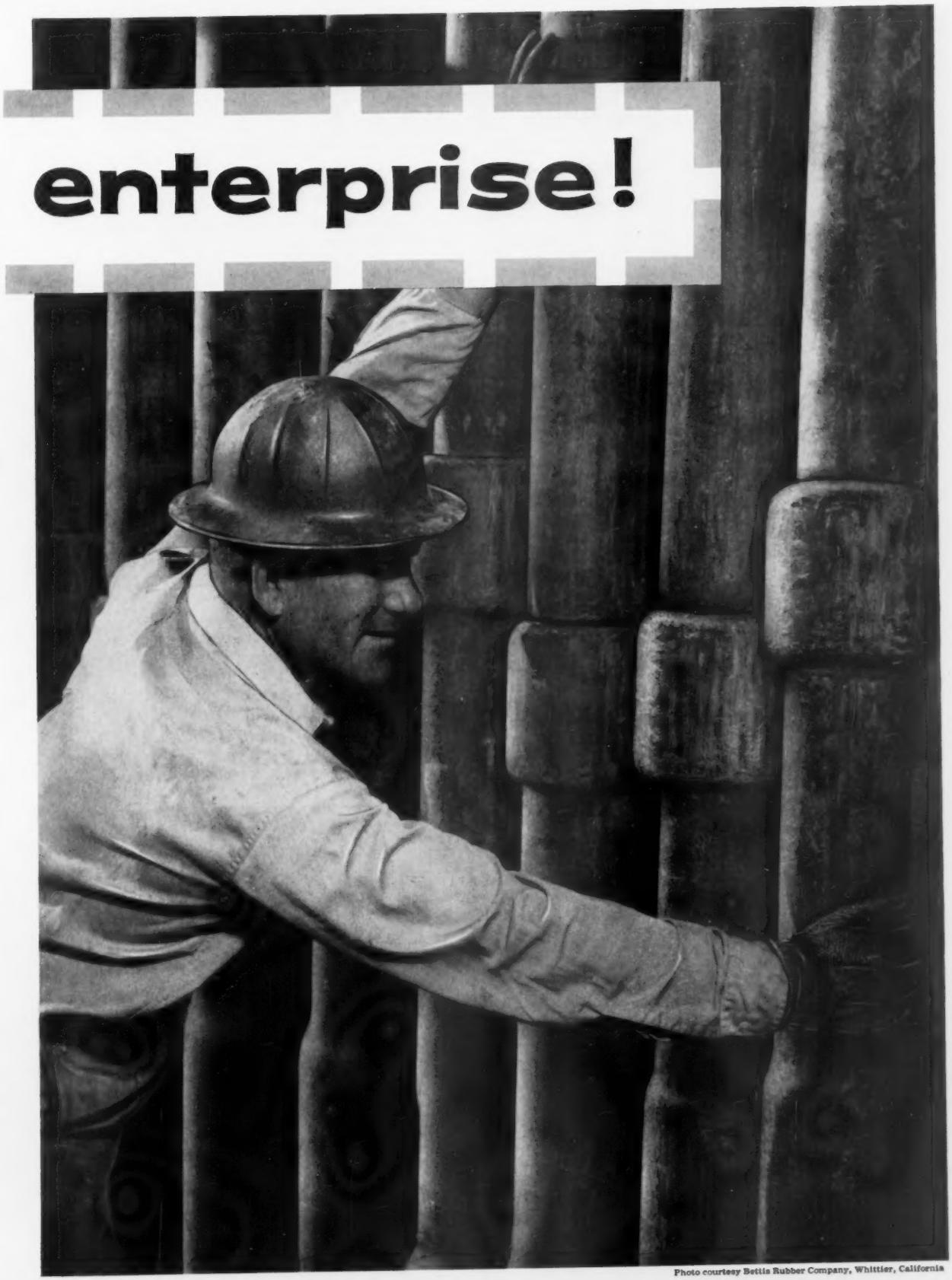
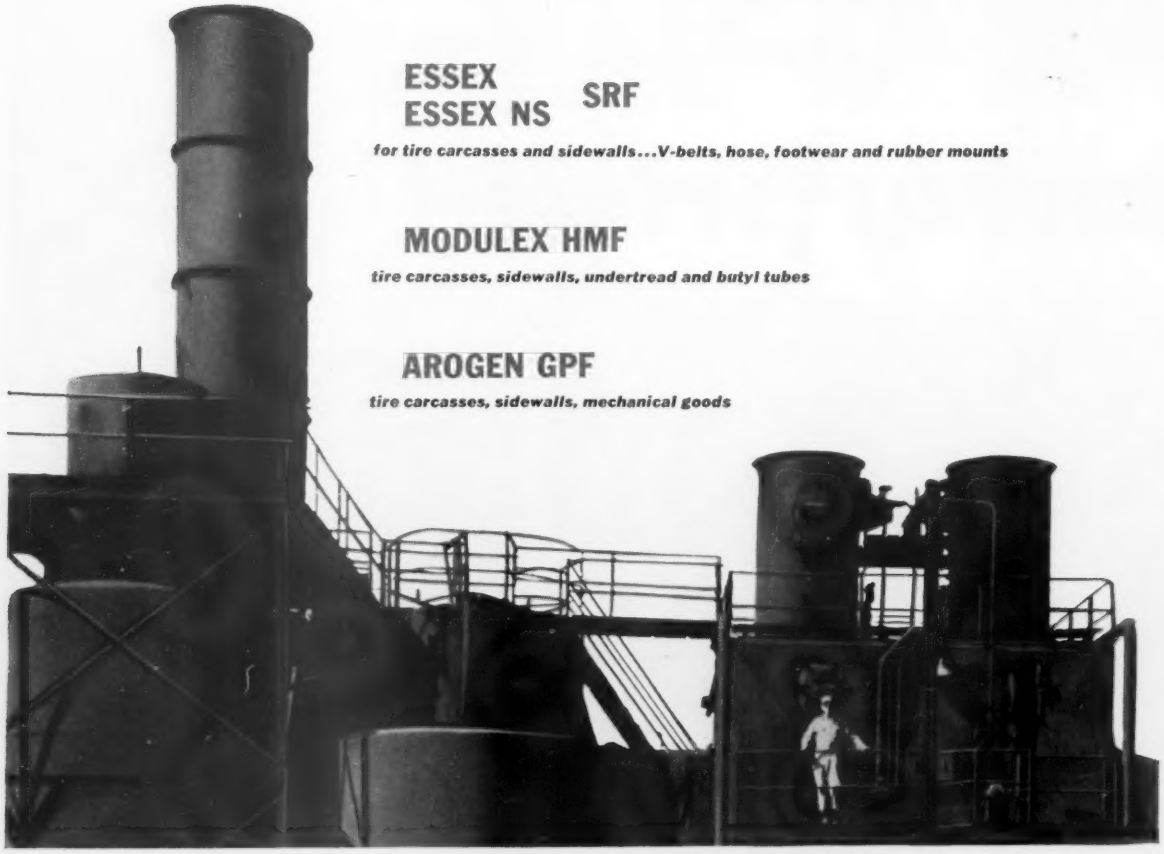


Photo courtesy Bettis Rubber Company, Whittier, California



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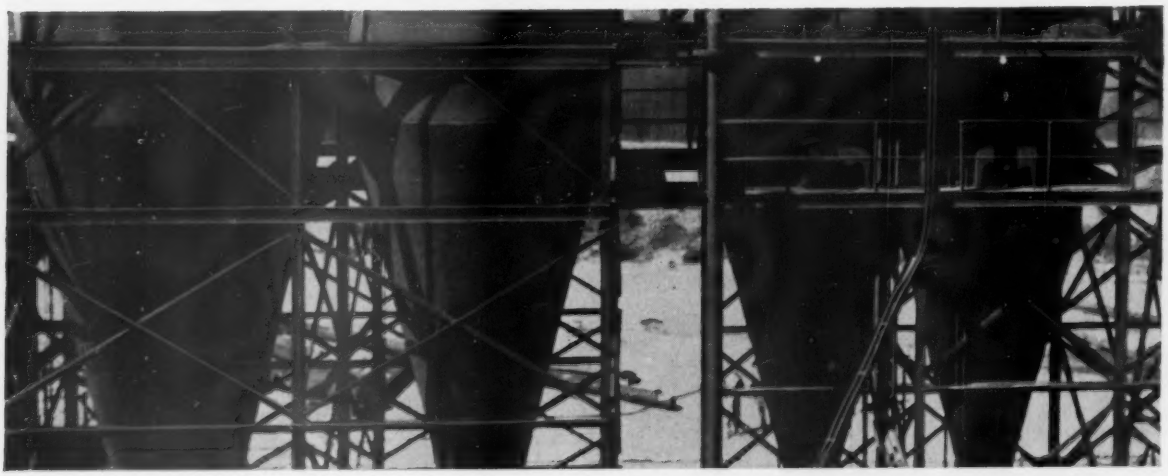

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Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

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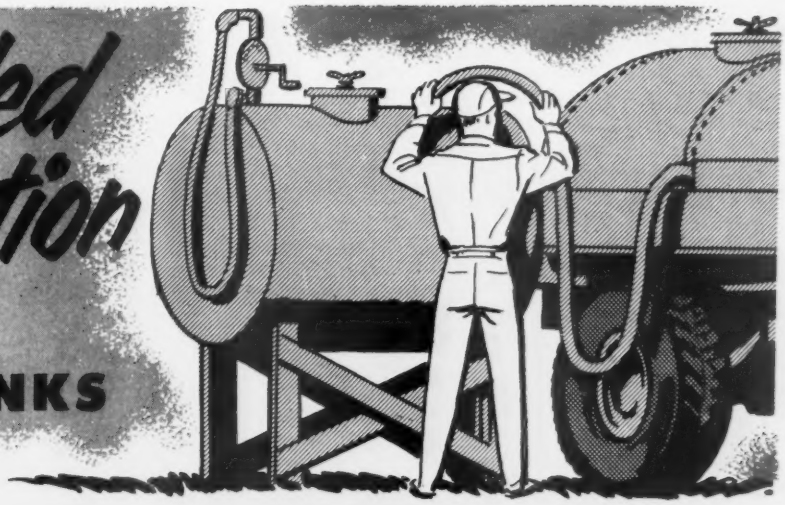

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Designed for fast, efficient operation, Day Blenders can be equipped with a variety of agitators for your specific product. Anti-friction bearings, metallic seals, spray pipes, flush valves are available as optional equipment.

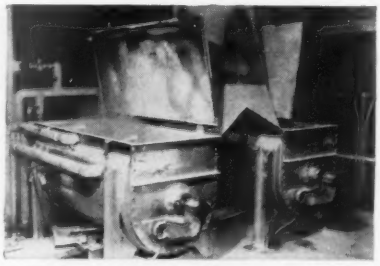

Photo shows two of many Day Blenders being used at the Goodyear Tire & Rubber Co. for mixing a variety of compounds.

Day Blenders are available in capacities from one cubic foot to 2300 cubic feet. Plain, galvanized or stainless steel tanks. Jacketing is optional. Write for Bulletin 800.

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Letters to the editor

Stockpile Note

Dear Sir:

You will recall that in the August, 1953, issue of RA I briefly outlined a very simple method of overcoming the heavy losses due to the spoilage of stockpiled rubber, namely, spray the latex into a chamber or room continuously supplied with the proper type of hot smoke.

My idea is that a high chamber, say 30 feet from floor to ceiling, would provide the opportunity to spray the latex *upward* at an angle, starting about the 20 foot level, which would give more time for the hot smoke to "cure" and dry before the small particles fall into a large tray on the floor. To prevent excessive heat, a thermostat should be used.

One must turn to rubber history in the period 1825 to 1845 to prove that smoke-curing did preserve rubber shoes against spoilage as made by dipping wooden lasts in latex in the Amazon Valley as directed by the brilliant Boston merchant, Thomas C. Wales.

It should be explained that although Charles Goodyear discovered vulcanization in 1839, the first factory using the sulfur "cure" in a large way did not start until 1845.

QUINCY TUCKER
St. Petersburg, Florida

Latex Argument

Dear Sir:

The article in the October, 1955 issue of RA on the subject of Firestone's Los Angeles depot is misleading.

The Los Angeles municipal port storage facilities for latex of approximately 455,400 gallons is not the "largest port receiver of latex in the United States."

We here at Latex and Rubber can store 600,000 gallons and there are installations such as Firestone at Baltimore and U. S. Rubber at North Bergen, N. J., which are larger.

ARTHUR NOLAN
Latex & Rubber, Inc.
Baltimore, Md.

Seems like the Los Angeles Harbor Department was carried away. At least they are trying.—ED.

Swimming, Anyone?

Dear Sir:

I would be grateful if you could tell me whether any rubber manufacturers continue to make rubber swim suits.

In 1936, while in New York, I purchased a pair of rubber swimming trunks for myself and a swim suit consisting of halter bra, shorts and tight rubber underpants for my wife. We were still using them for the beach in 1945.

These rubber swim garments were comfortable because they were never cold to put on and always dry. They dried quickly out of the water so that they could be worn beneath slacks or dress both before

Photo courtesy Certified Creations, Inc., New York, N. Y.

Here's the key to colorful foamed rubber

Being cellular makes foamed rubber difficult to protect from oxidation. Some staining antioxidants are effective, but of little value since most uses for foam rubber require bright, clean colors.

Take the distinctively colored, snug-fitting, washable coasters pictured above. They would quickly lose their appeal and utility if they discolored or were inadequately protected. But they won't, thanks to WING-STAY S, the truly nonstaining antioxidant.

WING-STAY S is a liquid phenol-styrene copolymer which is not extracted by water in foam latex and is nonvolatile in the large surface area of foam rubber. It is highly resistant to heat, sunlight and age—protects without odor, migration or discoloration.

Full details on WING-STAY S plus the latest Tech Book Bulletin are yours by writing to: Goodyear, Chemical Division, Akron 16, Ohio.

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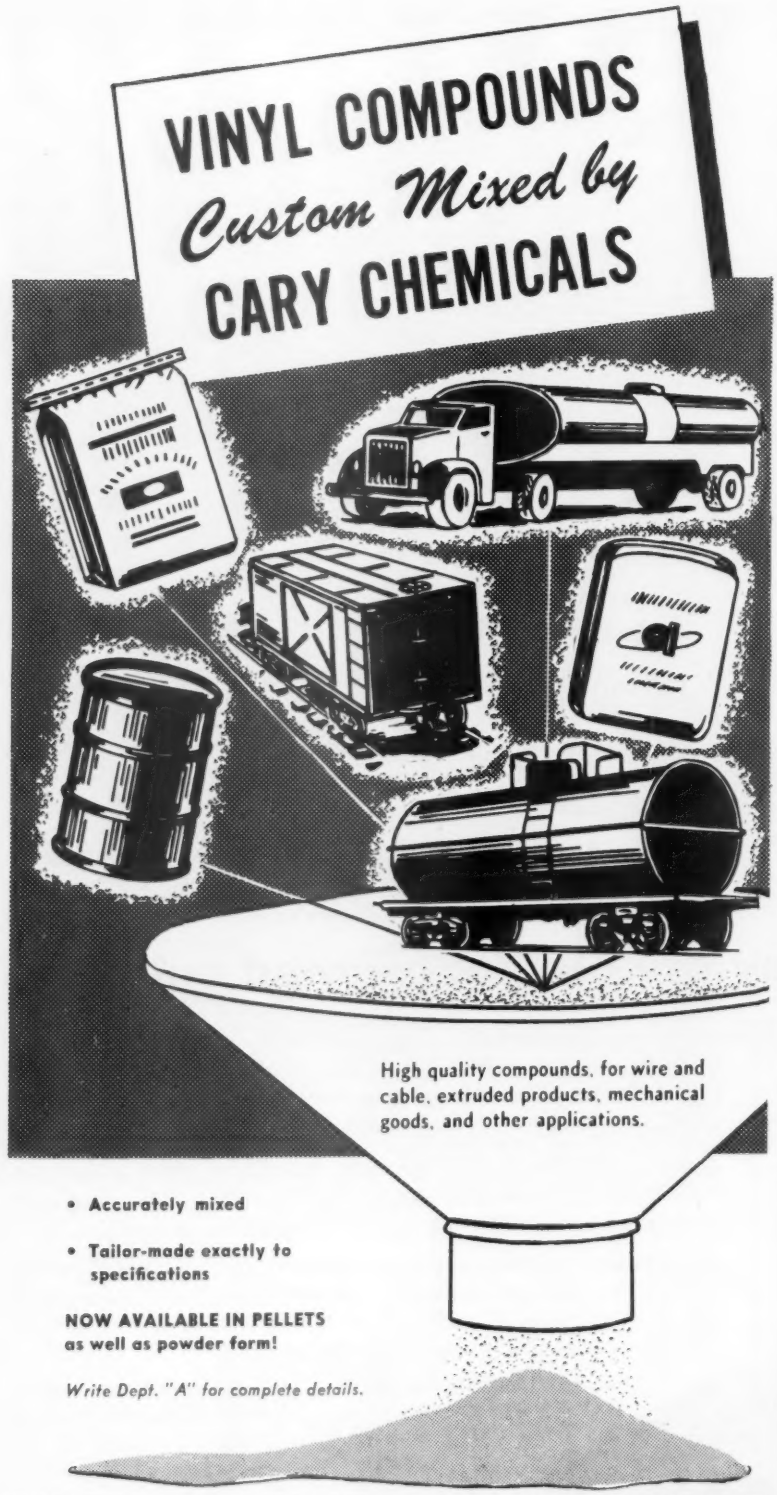
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• Tall Oil Esters

and after a bathe if changing in public presented a problem. They were distinctly flattering to the figure and their colors remained stable.

These qualities are not fully present even in the nylon-elastic garments which, though they dry quickly, cannot be dried completely dry with a towel as one can dry a body or a rubber suit, and they still feel chilly if damp.

It seems a pity that such a useful, practical and attractive form of beach garment has gone out of fashion. I feel also that the problem of sun tan oil causing the rubber to perish would cause little trouble in these days of synthetics.

J. Llewellyn Jones
West Mersea, Essex,
England

Standards vs. Clarity

Dear Sir:

It seems to me that this entire question of specifications, so ably discussed in the editorial in your January number, needs some clarification. The final goal for any specifications, as they apply to synthetic rubber, should be clarity. That is to say, the consumer should always be apprised of exactly what he has purchased. Moreover, what the consumer is told should be told him in exactly the same way by all producers. Specifications should not mean that each manufacturer be forced to produce precisely the same commodity as his competitor.

Some over-zealous individuals and organizations, in attempting to ease the situation with reference to synthetic rubber, appear to be advocating a stifling uniformity of end-product. If this is the case, we must not only be prepared to accept sameness of product, but sameness of price, etc. In the long run, a serious lethargy could envelop the industry in which uniformity rather than new horizons are the order of the day.

It is therefore suggested that in future discussions on this question of specifications let our aim be clarity of expression rather than standardization as a bookkeeping device. The best interests of the industry will best be served by an adherence to this principle.

Name Withheld

Memo from the Editor

The "Letters to the Editor" columns were inaugurated with the previous issue. They are open to all of our readers and we invite you to send along your comments for publication. These comments may be specifically applied to published articles and news items or may reflect your own views on any facet of the rubber industry. We reserve the right to edit all material. Address: Editor, RUBBER AGE, 101 West 31st St., New York 1, N. Y.

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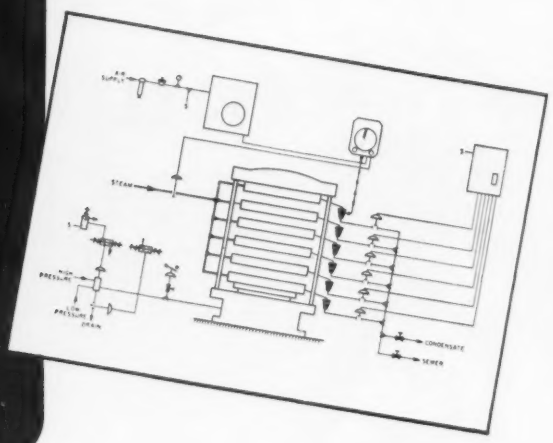
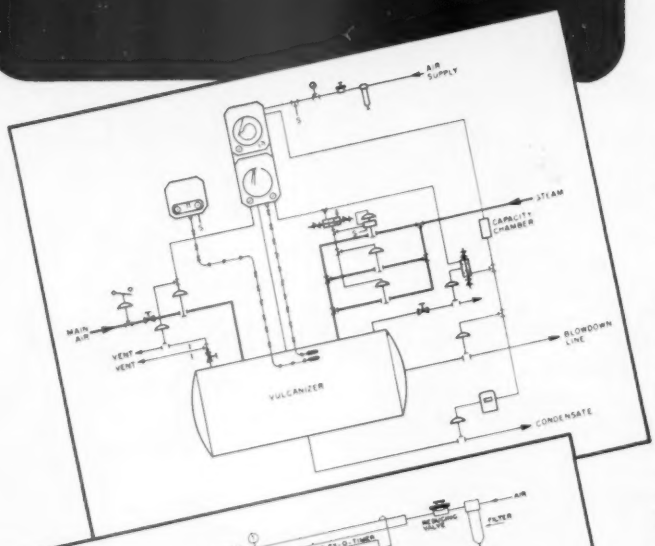
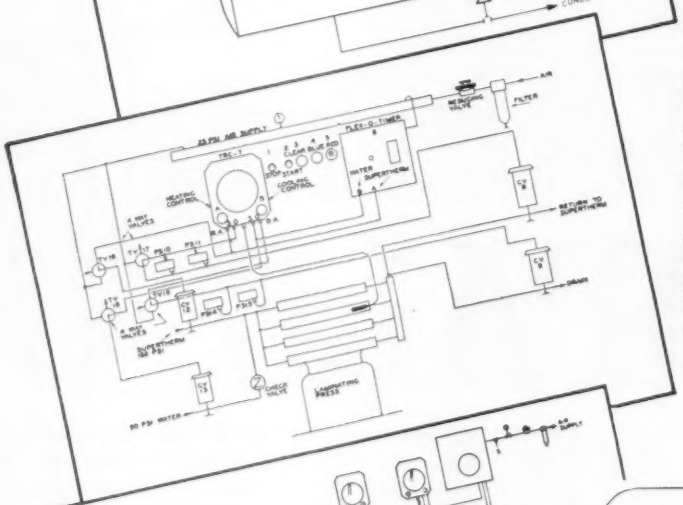
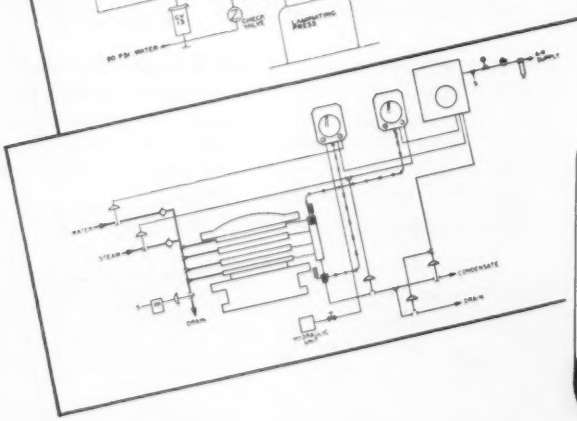
What do all these Control Systems have in common?









1. **They insure uniformity of product quality.**
2. **They keep rejects to the minimum.**
3. **They can be readily adapted to changing process requirements.**

The schematic drawings shown here represent just a few of the many applications in the rubber industry where Taylor Control Systems are providing automatic control—accurately and dependably.

Whether you make tires, foam rubber or mechanical goods, if your business reputation depends on maintaining rigid quality standards, it will certainly pay you to discuss control possibilities with your Taylor Field Engineer. You'll probably find he's personally familiar with your specific problem—if he's not, our Application Engineering Dept. stands ready with the answers, based on years of experience in instrumenting rubber installations. If you prefer to put the problem in writing, drop a line to Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

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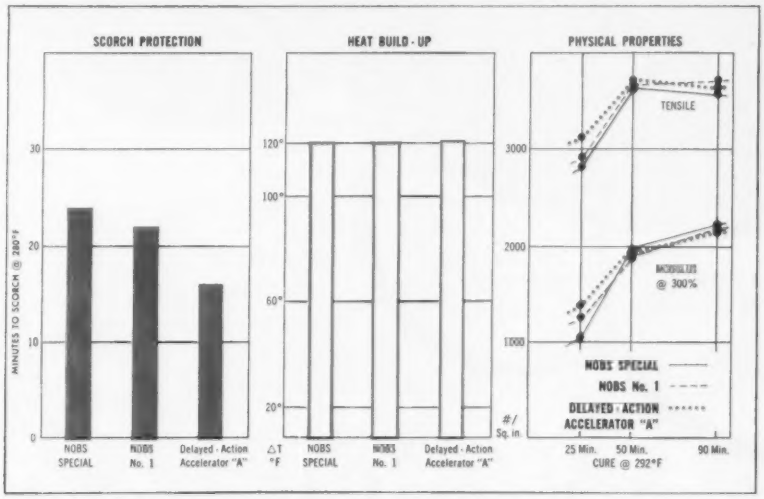


FIG. 1 FIG. 2 FIG. 3

The scorch protection imparted to rubber stocks by the NOBS* accelerators—with no sacrifice of desirable physical properties—is shown in these comparison charts. Both NOBS No. 1 and NOBS SPECIAL accelerators provide excellent physical characteristics at optimum cure.

Burnt Stock is on the Decline

"We achieved a fifty per cent reduction in burnt stock during the past year..." "January brought a record low in scorched stock."

Such statements are not uncommon among users of NOBS* No. 1 and NOBS* SPECIAL, the newest and finest delayed-action accelerators. In addition, users are achieving better mold flow, excellent dispersion, easy handling of these free-flowing materials, and a marked reduction in dust in the millroom and compounding room.

The need for top-speed runs of stocks through existing processing equipment to meet production schedules has accentuated the demand for safe, scorch-free compounds. Also, the widespread use of fine furnace blacks and tougher, more resilient polymers to produce better tire treads have further emphasized the need for accelerators that help prevent scorching. The NOBS delayed-action accelerators meet both of these requirements without sacrificing desirable properties in the processed stock. (See Figs. 1, 2, 3)

To fill the growing demand for these chemical accelerators, additional production facilities have been added to our new plant.

Both NOBS No. 1 and NOBS SPECIAL are particularly recommended for tire treads and molded products containing substantial amounts of high pH furnace black. Also stocks for floor tiles, heels, soles, wire insulation and the like can benefit from their use.

*Trade-mark

Synthetic "Tree" Rubber—A Research Triumph

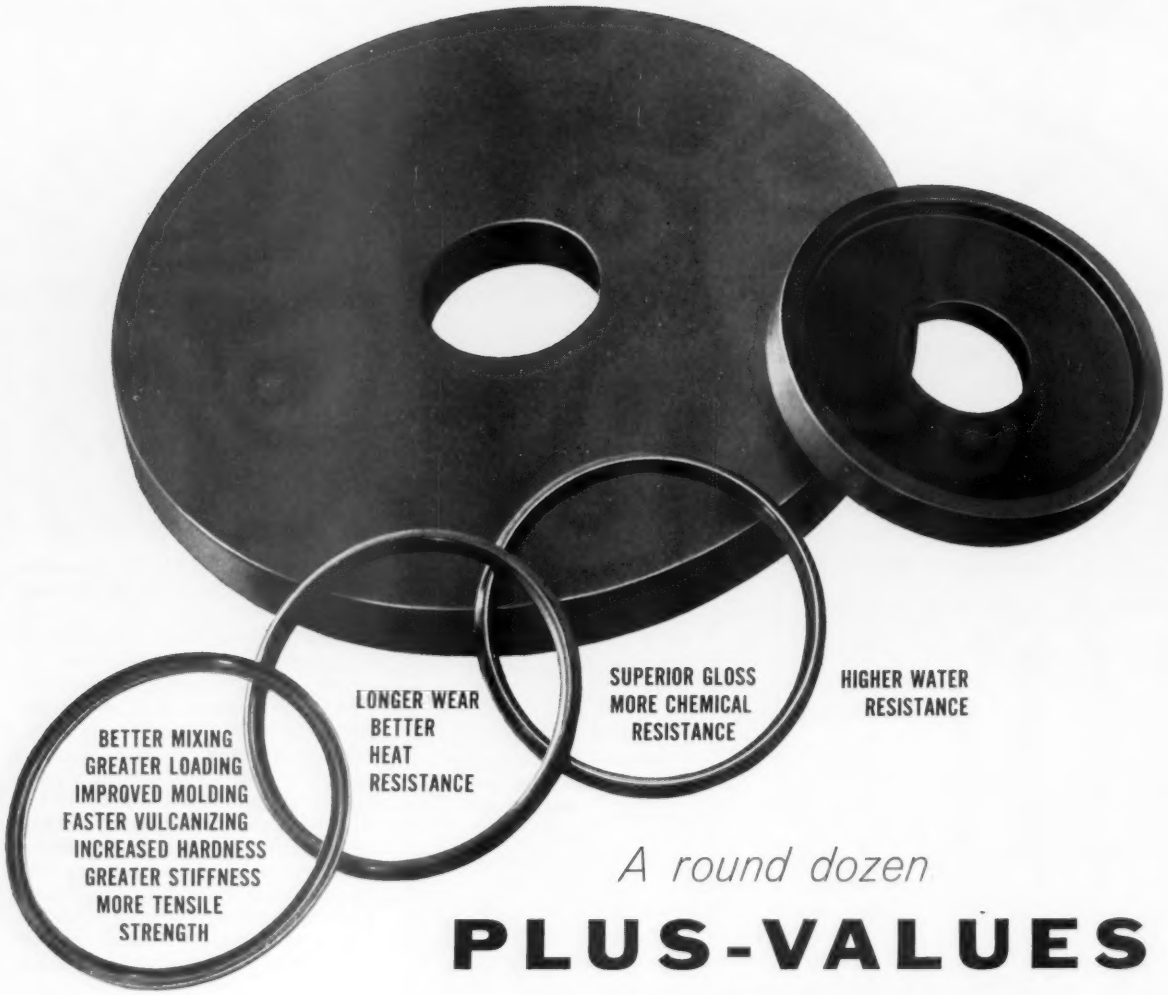
One of the most significant advancements in rubber research was achieved recently by scientists who developed the new synthetic "tree" rubber. Their achievement climaxed years of research, intensive testing and finally pilot-plant production to prove the practicability of this rubber.

Regarded as a "complete replacement" for natural rubber from a practical standpoint, the new rubber is described as superior to natural rubber in its resistance to cracking, to attack by oxygen and to heat. In its low heat build-up it is essentially identical in character with natural rubber, and its ability to retain its strength at high temperatures makes it ideal for truck tire service.

For years, rubber chemists and other scientists have struggled to develop a synthetic rubber suitable for high-speed truck tires. The GR-S type was found to be unsatisfactory for many truck tire sizes, especially since trucks often run with heavy loads for long distances, causing tremendous heat build-up.

Made from isoprene by polymerization, the new synthetic requires the same accelerators and vulcanizing agents as for GR-S stocks, also the same types of reinforcing agents and softeners. And because it breaks down much more easily than GR-S, the amount of softeners and plasticizers used is generally less – about equal to that for natural rubber.

The developers of this new synthetic have placed their patent rights and research data at the disposal of the government and the entire industry. Coming at a time when the synthetic rubber industry has only recently been removed from government control, this new development is a prime example of the tremendous forward strides possible for an industry free to move on its own.



A round dozen

PLUS-VALUES

for hard and semi-hard Buna-N stocks

● Discover the impressive effects Durez phenolic resins can have on your operations . . . in improved processing, in enhanced end-product properties.

For example, we list above the benefits being obtained with a group of these resins developed for incorporation with Buna N's. The resins are completely compatible with synthetic rubber of this type and serve as plasticizers at processing temperatures. Owing to chemical reactivity, they contribute strongly to vulcanization, reinforcement, hardness, stiffness, abrasion resistance, and other characteristics desired in hard and semi-hard Buna N stocks.

Other Durez phenolic resins are recommended for specific advantages . . . with GRS in shoe sole and heel stocks, with natural rubber and Neoprene molding compounds, and in both air-dry and thermosetting adhesives.

Our experience as pioneers in perfecting resins for the rubber industry is at your service. For more information on how they can help to solve specific problems, write, giving details please.

DUREZ®

Phenolic Plastics for the Rubber Industry

DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY
102 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER® CHEMICALS & PLASTICS

Makers of the Trail

FEBRUARY 12, 1809 **FEBRUARY 22, 1732**

Destiny separated these two dates by less than four score years, yet the two men whose birthdays they represent were to become the two most important personalities in the unfolding of American history.

In 1732 the vast continent was still little known; people were clinging to the areas on or within short reach of the sea. In 1809, independent and free, ambitious and fearless, Americans set their faces westward and the small nation began to expand.

It was the destiny of the man born in February 1732, in spite of heart-breaking and discouraging obstacles, to join a people together; it was the destiny of the one born in 1809 to keep this same people together.

These were the men, each in his own time and under the circumstances which surrounded him, who blazed a new trail into the future, a trail for a nation and all of its people, for all the years to come. Out of their struggles and sacrifices, and out of their faith and constancy has grown America and democracy and freedom, "of the people, by the people, for the people," which we may easily follow if we so choose. Because of Washington and Lincoln the trail became well marked for all time.

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Advance thinking on carbon black is set on intermediate super abrasion furnace black, ISAF — Dixie 70, to be sure — the oil-base black widely favored in natural and synthetic rubbers. It does well in processing and imparts exceptional reinforcement, improved tread wear, and better resistance to tread cracking.

Dixie 70 is in step with the need of an expertly-made black with stamina for modern rubber goods.

For excellence in blacks specify United. Their brands are a warranty of quality understood and sought after by compounders everywhere.

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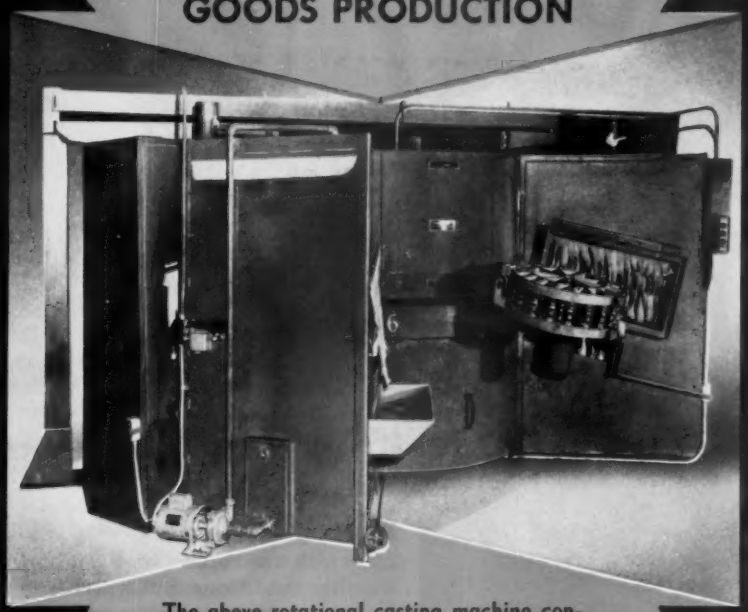
Profits go up when you install our fully automatic rotational casting machine for making hollow plastisol articles. It is a high speed production unit, operated by one person who handles only the raw material and the finished product.

HERE IS THE MACHINE WHICH IS REVOLUTIONIZING HOLLOW GOODS PRODUCTION



The above rotational casting machine consists of a turret base on which are assembled six radial arms, each carrying multiple cavity molds equivalent to a 25 inch diameter molding area. The machine is adjustable from a cycle of 3 to 5 revolutions per hour and the individual spindles rotate at separately controlled speeds. The cycle of production carries the multiple cavity molds through the electric oven for progressive gelling, thermosetting and through cooling chamber, emerging with finished, resilient products. The machine is very compact and can produce as many as 1620 articles per hour. Tell us what you wish to manufacture and we will tell you how to make it faster, with more profit.

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New products keep life flowing in any business and our rotational plastisol casting machine offers new opportunities. If you have a new product idea, call on our development department for assistance.

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Phone: WAlbridge 8-2105

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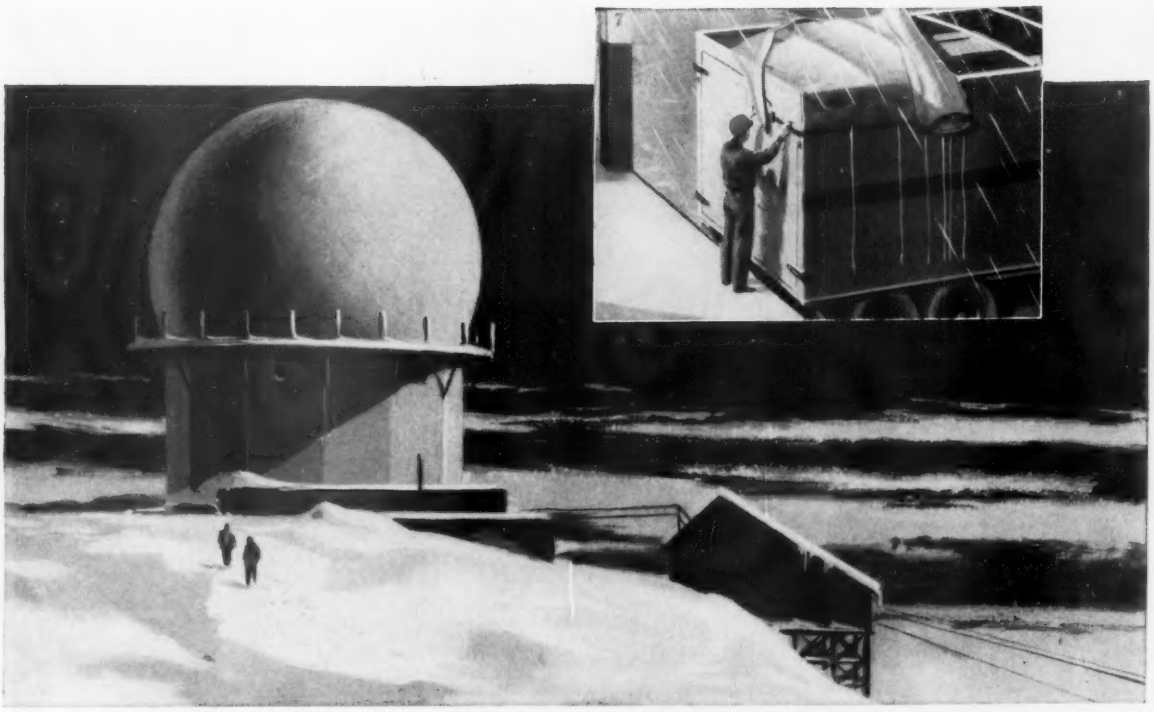
FORMS	MOLDS	DIES	MACHINERY
LATEX DIPPING	STEEL AND ALUMINUM	PLASTIC-INJECTION	SPECIAL-AUTOMATIC



Is the reinforcing fabric you use *ENGINEERED* to do the job?

Maybe you may never have to produce a finished product which must stand up under high pressure or severe weather conditions. But whether the specifications call for strength, flexibility, resistance to weather or any other qualities, there's no escaping one fact: a rubberized or coated fabric will perform as promised *on* the job only if the base fabric itself has been engineered to *do* the job, by the people who make it for you.

When you use a Wellington Sears base fabric, you know every on-the-job need has been considered and met—with plenty to spare—because we've been engineering fabrics for industry for more than a century. And it's this experience that pays off for you, in your finished product.

Whether it's a base fabric for pressurized radomes, for industrial hoses, for vinyl or neoprene coated tarpaulins, for vinyl auto and furniture upholstery or for any rubberizing or coating use, call on Wellington Sears—for the *fabric engineering experience* it takes to help you solve your specific problem.

For informative booklet, "Modern Textiles for Industry," write Dept. G2.

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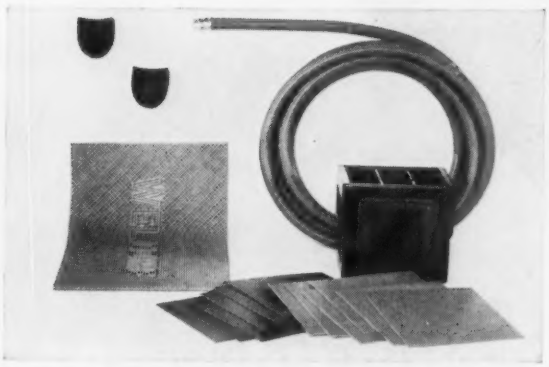
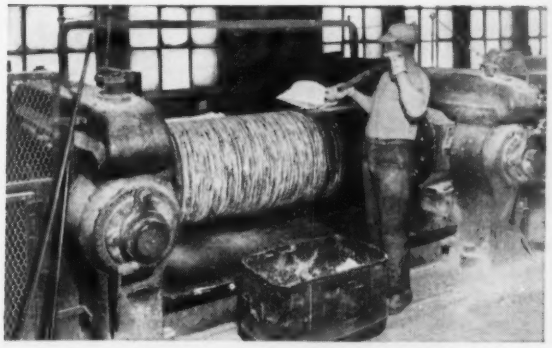
New polymer offers rubber industry important improvements



Properties of A-C* POLYETHYLENE – Tests in laboratories and by commercial operators show that low-molecular-weight, low-viscosity A-C POLYETHYLENE has solved many problems in rubber processing. A-C POLYETHYLENE, available in pellet and powder form, is easy to handle in your plant equipment. Emulsifiable grades are also available.

Shrinkage Greatly Reduced – Addition of A-C POLYETHYLENE to milled stocks can sharply reduce shrinkage, permitting adherence to closer dimensional tolerances. In one case, shrinkage of a synthetic formulation was reduced by 75%.



Excellent Detackifying Properties– A-C POLYETHYLENE is a superior detackifying agent, especially at elevated Banbury, mill and calender temperatures of 200°F. and higher. This property is particularly valuable when compounding synthetics. It has demonstrated exceptional qualities as a mold release; as a lubricant it allows higher operational speeds.

Compatible with Natural and Synthetic Elastomers

Reports from commercial users indicate that up to 25 parts of A-C POLYETHYLENE per 100 parts elastomer can be used with no indication of incompatibility. A-C POLYETHYLENE-elastomer blends have possible interest where greater resistance to oils, solvents, acids and alkalies is required. It is often reported that gloss and scuff-resistance of the product are enhanced and color and filler dispersion are accelerated. A-C POLYETHYLENE is giving the rubber industry new products and new qualities to familiar products. Try it today! Production quantities are readily available.

Information and Samples Available – Preliminary technical data is available in an eight-page brochure. Samples of A-C POLYETHYLENE are also yours for the asking.

A-C* Polyethylene

*trade-mark

Allied Chemical

SEMET-SOLVAY PETROCHEMICAL DIVISION
Allied Chemical & Dye Corporation
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Nylon Heavy Yarns are of special interest in the production of automobile

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Now Available: a completely new class of durable textile yarns for industrial fabrics and mechanical goods where toughness and high impact strength are essential requirements. Called Caprolan *tensile-tough* nylon, the heavy yarns are now being produced in 2,100, 2,500, 5,000 and 15,000 total denier. Eventually they will be produced in the complete range of 2,000 to 50,000 total denier according to your specifications.

Caprolan *tensile-tough* nylon heavy yarns have a *minimum* average standard tenacity of 6.5 grams per denier, and retain 90 per cent of their strength in the wet state. Initial put-ups are on ten-pound parallel packages and contain *nominal* twist. These packages create no twisting problems in the mill and eliminate the need to ply several ends of smaller deniers to obtain a higher total effect.

For information and technical assistance, write: Fiber Sales and Service,

NATIONAL ANILINE DIVISION

261 Madison Avenue — *New York 16, N. Y.*

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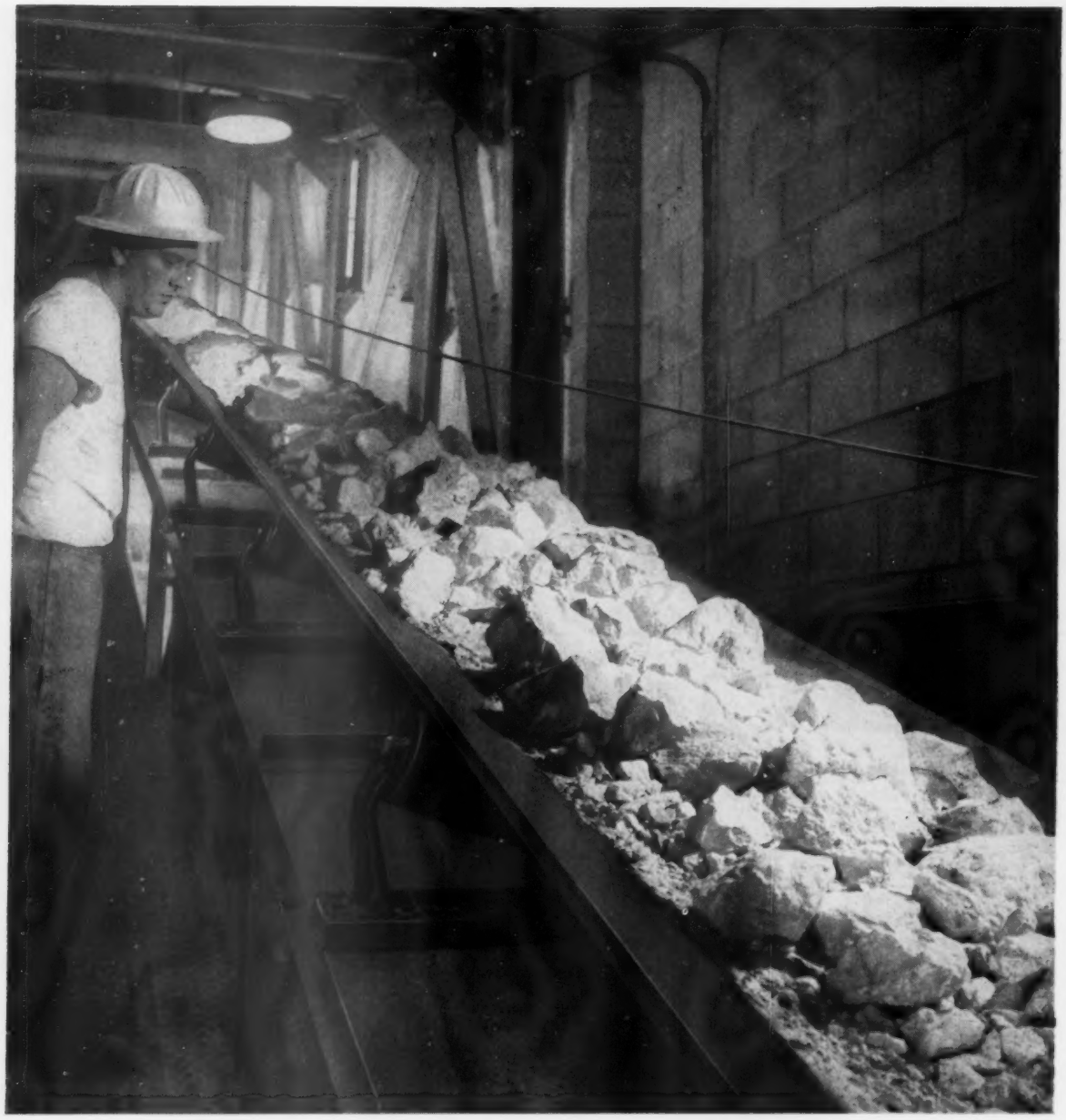
safety belts, hoses, heavy duck, conveyor fabrics, filter fabrics, industrial slings, webbing, tapes, cords, seine twine, belting and ropes.



THE FABRIC THAT MOVES MOUNTAINS – National Gypsum Company's new gypsum mine at Shoals, Indiana, needed a really tough conveyor system employing a belt nearly a mile long – one that could move loads up to 350 tons per hour up a shaft 500 feet beneath the surface of the earth at an incline of better than 17 degrees. Hewitt-Robins, Inc., supplied this belt – with a carcass especially constructed from rayon and nylon by Mt. Vernon-Woodberry Mills. The new belt, called a Super Raynile Conveyor Belt, is lighter than comparably strong cotton duck and rubber. It is more resilient and equal in strength to steel reinforced belting. Testing in use has shown it to be one of the strongest ever built.

This is another example of how fabrics made by Mt. Vernon-Woodberry Mills, and the industries they serve, are serving America. Mt. Vernon-Woodberry Mills engineers and its laboratory facilities are available to help you in the development of any new industrial fabric or in the application of those already available.

UNIFORMITY Makes The Big Difference In Industrial Textiles

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Vulcan 3 gives the same outstanding reinforcement, high abrasion resistance, excellent processing and good extrusion today that made it the top quality HAF black of the industry when it was introduced in 1949. For the best in HAF carbon blacks, rubber manufacturers continue to specify Cabot Vulcan 3 . . . now available for the first time at channel black prices throughout the world.

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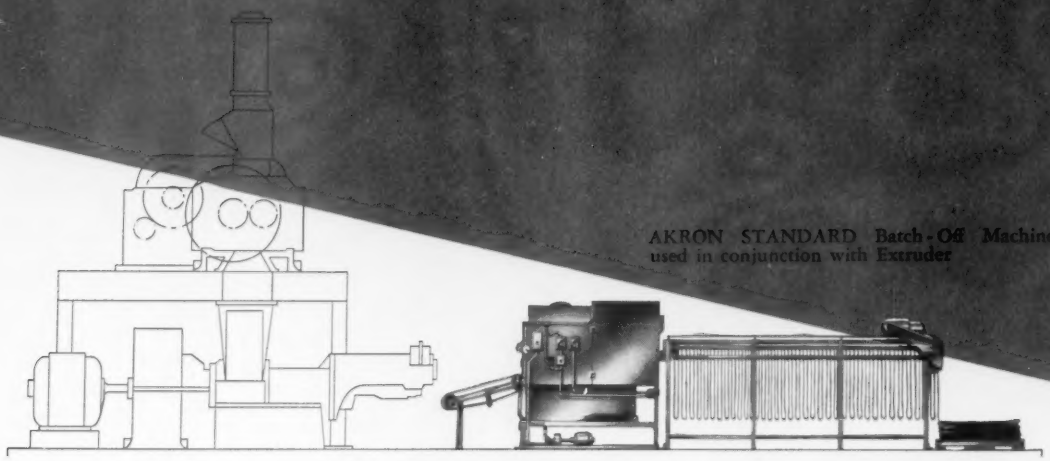
IS YOUR BATCH-OFF EQUIPMENT



AKRON STANDARD Batch-Off Machine
used in conjunction with Extruder

Let AKRON STANDARD Help You Step Up Your Production Efficiency!

AKRON STANDARD Batch-Off Machine
used in conjunction with Banbury Mill

You can step up the efficiency of your mill room with an AKRON STANDARD Batch-Off Machine.

One of these versatile units will help you eliminate costly and tiresome hand operations — will help speed up your Banbury cycles. The illustrations show how you can remove continuous sheets of stock up to 36" in width — directly from a mill or an extruder — through a lubricant and on to the rack, properly spaced and automatically festooned.

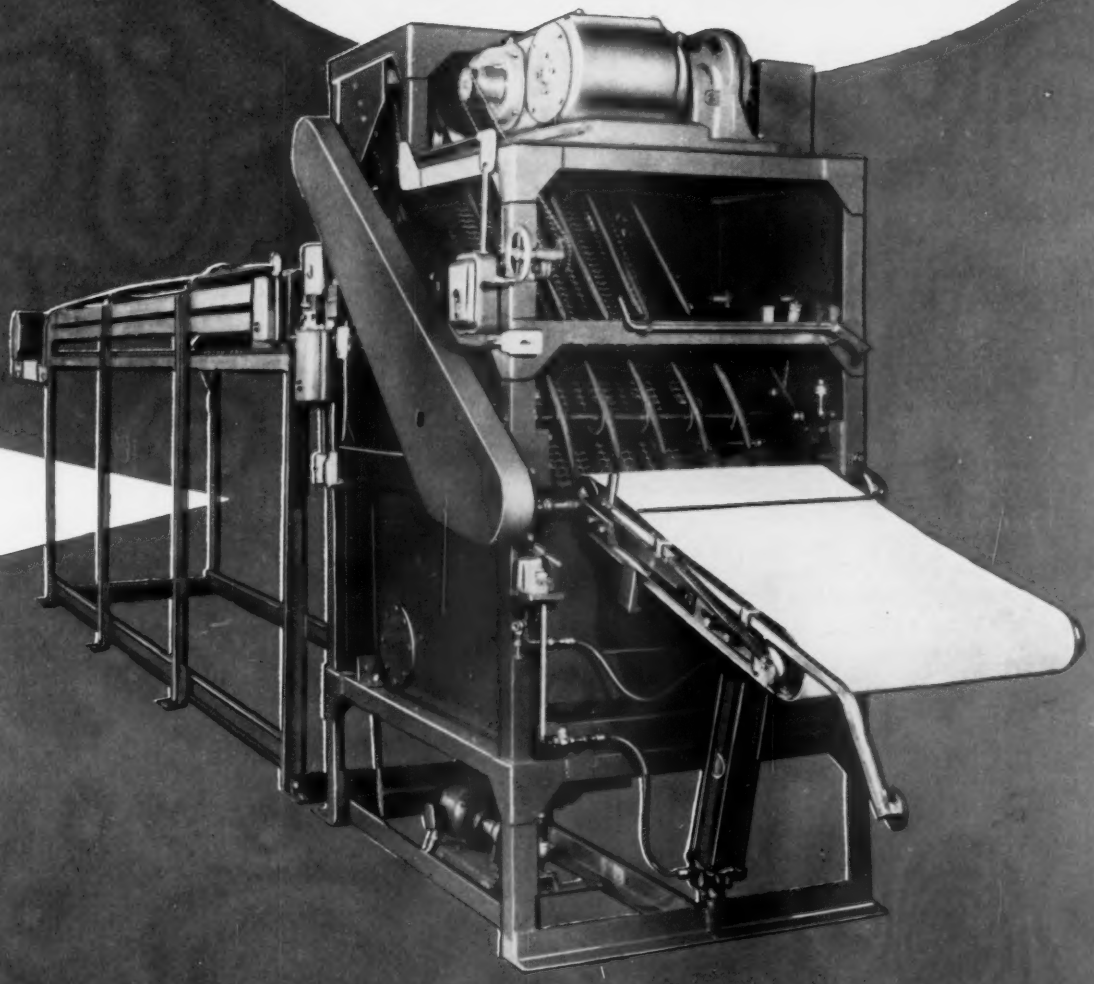
Low in original cost, you'll start saving money with a dependable AS Batch-Off Machine the day you put it to work. And your savings will continue, year after year, because it is as foolproof and maintenance-free as only an AKRON STANDARD-built unit can be.

Proof of the established value of AKRON

The **akron standard**

1624 Englewood Ave. Akron [illegible], Ohio — U.S.A.

UP TO STANDARD?



STANDARD Batch-Off Machines is found in the fact that all major and many smaller tire manufacturers use them.
We will be pleased to help you with *your* problems. Let us start by furnishing you with more detailed information including layout drawings. Then, if you wish, let us arrange for you to see installations in your area. Write, wire or telephone us today!

ALL TYPES OF RUBBER PROCESSING EQUIPMENT ENGINEERED FOR YOUR REQUIREMENTS

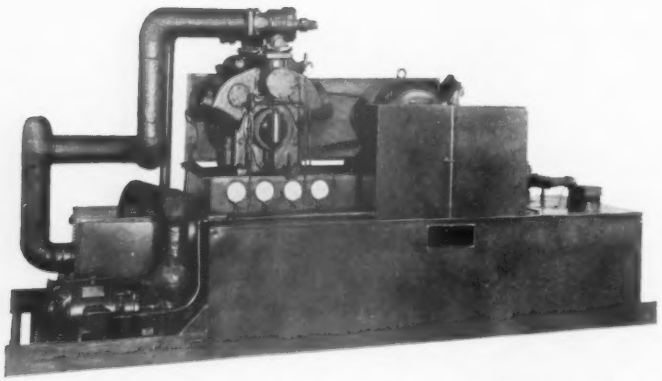
Mill Aprons Mill Blenders

Plus new developments in Batching-Off

mold company

"THE ESTABLISHED MEASURE OF VALUE"

Are YOU Getting The Built-in Production Potential From Your Present Equipment?

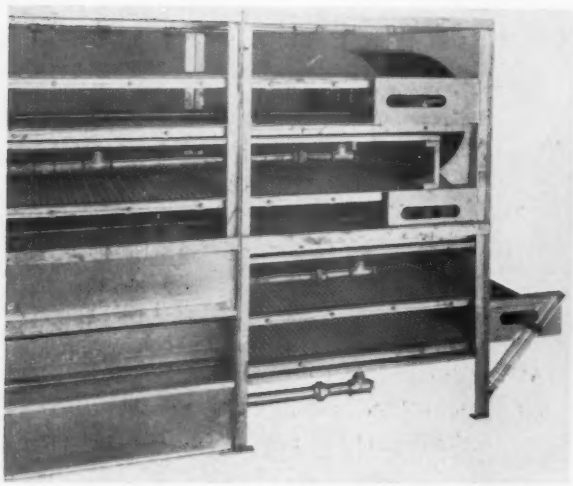


The Mayer chiller and recirculating unit that cools, pumps and recirculates the coolant for rubber processing equipment.

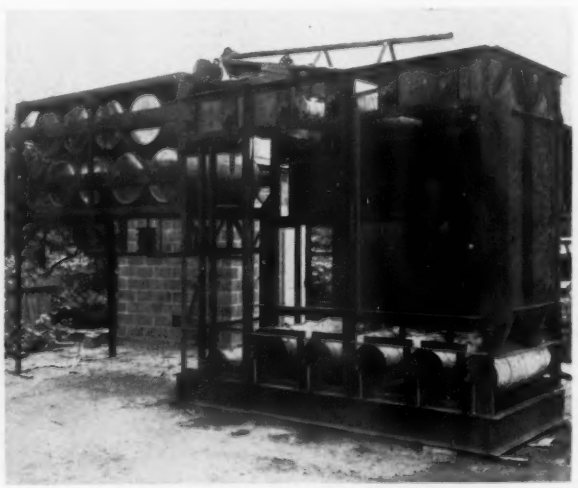
YOU CAN . . .

. . . with Mayer cooling units designed and engineered specifically for rubber processing.

The units illustrated reduce processing temperatures from over 300°F to room temperature in a matter of minutes. The results — a tremendous increase from *existing* plant equipment investment.



A special Mayer unit designed to cool a batch operation.



A special Mayer unit designed to cool a continuous sheet operation.

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Specialists in Industrial Process Cooling

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You've got to know the answers to a lot of technical questions when you're in the rubber business! Phillips Chemical Company is an old-timer in the field of synthetic rubber research; we grew up with the industry. We also are pioneers in creating polymers and masterbatches to meet specific needs.

Our technical department, for example, can help with such problems as how to prevent staining . . . how to control shrinkage or die swell . . . how to improve physical properties without increasing costs. Our modern, well-staffed, fully-equipped sales service laboratory is continually testing and experimenting . . . and coming up with practical solutions to many rubber problems. Take advantage of our technical assistance, without obligation. Just consult our Technical Representative.

CURRENT PHILPRENES	*Each is comparable to former GR-S with the same numerical designation except 1605 and 1803 as noted below.* HOT	COLD	COLD OIL EXTENDED
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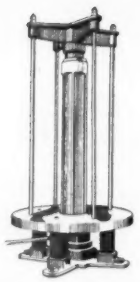
MASTERBATCHES		PHILPRENE 1601 PHILPRENE 1605* *Philblack A cold rubber masterbatch	PHILPRENE 1803 similar to GR-S 1801 but incorporating 25 parts Philrich 5

PHILLIPS CHEMICAL COMPANY
Rubber Chemicals Division
318 Water Street, Akron 8, Ohio

Phillips 66

in the good old days

When it was necessary to reinforce the floor under the weight-type accumulator installation . . . when the maintenance gang held its breath to see if the old accumulator would rise far enough to keep pressure in the lines . . . when it was possible to keep packing on the accumulator ram only for a week or so



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today...we're still pioneering...

Erie Foundry offers this compact, lightweight, minimum maintenance hydraulic power system with many worthwhile advantages:

a 10 h.p. electric motor which drives
a 300# accumulator for low pressures, and
a 2000# air bottle with a separating cylinder for high pressure, which is charged by
a small radial air compressor driven by
a 7½ h.p. electric motor, plus
a control unit—electric, of course.

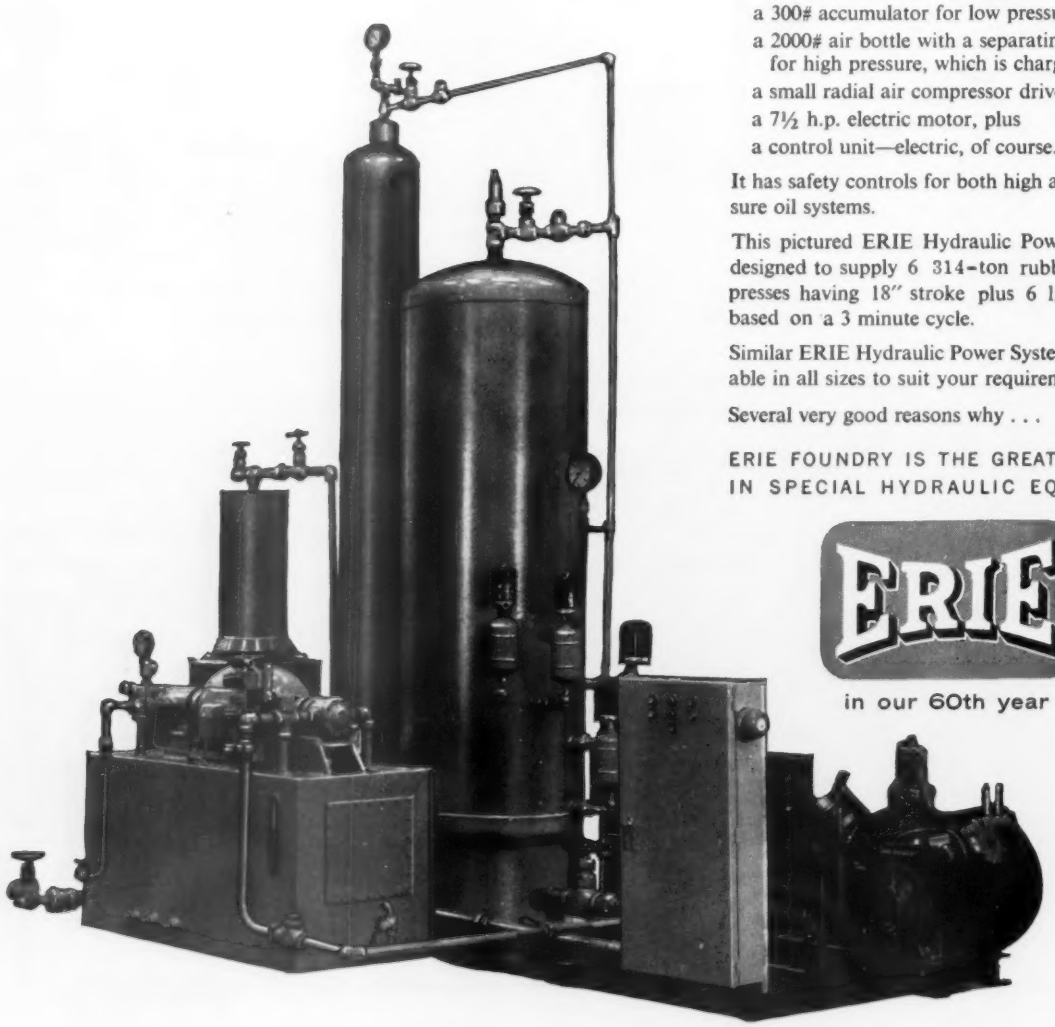
It has safety controls for both high and low pressure oil systems.

This pictured ERIE Hydraulic Power System is designed to supply 6 314-ton rubber-molding presses having 18" stroke plus 6 lift tables all based on a 3 minute cycle.

Similar ERIE Hydraulic Power Systems are available in all sizes to suit your requirements.

Several very good reasons why . . .

ERIE FOUNDRY IS THE GREATEST NAME IN SPECIAL HYDRAULIC EQUIPMENT



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helps to prevent "Curing Blows" like this!

Curing blows are a familiar and costly sight in some factories. Gen-Tac cuts these losses to a minimum, because it is fast curing and develops its strength in the early stages of cure when internal pressures do the most harm.

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THE GENERAL TIRE & RUBBER COMPANY
Chemical Division, Akron, Ohio

Chemical Division GENERAL THE GENERAL TIRE & RUBBER CO. GEN-TAC

J. D. ZELLERBACH

Portrait by Fabian Bachrach

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"At Crown Zellerbach we have 24,000 employees who, like the company, have bills to pay, plans to finance, and emergencies to anticipate. This requires saving.

"Crown Zellerbach saves a portion of its annual income in U. S. Government securities. This saving is safe, systematic and, with interest, profitable. Our employees follow the same 'Good business' practice through the Payroll Savings Plan.

"At our Camas, Washington, paper mill, for instance, 1,654 employees out of a total of 2,640 set aside a portion of their income last year and bought over $450,000 worth of U. S. Savings Bonds on the Payroll Savings Plan. To them this means money for the goods of today, the ambitions of tomorrow, and the security of the future. And this way of saving has the same advantages for an individual as for a company—a safe investment, a convenient method, and a profitable return.

" 'Good business', then, is not just for business. 'Good business' which includes systematic saving in Government bonds is for everybody."

J. D. ZELLERBACH, ***President***
Crown Zellerbach Corporation
Chairman, Committee for Economic Development
Chairman, National Manpower Council

If you do not have the Payroll Savings Plan . . . or if you have the Plan and employee participation is less than 50% . . . write to Savings Bond Division, U. S. Treasury Department, Washington, D. C. Your State Sales Director will be glad to help *you* express your agreement with Mr. Zellerbach..."Good business is for everybody."

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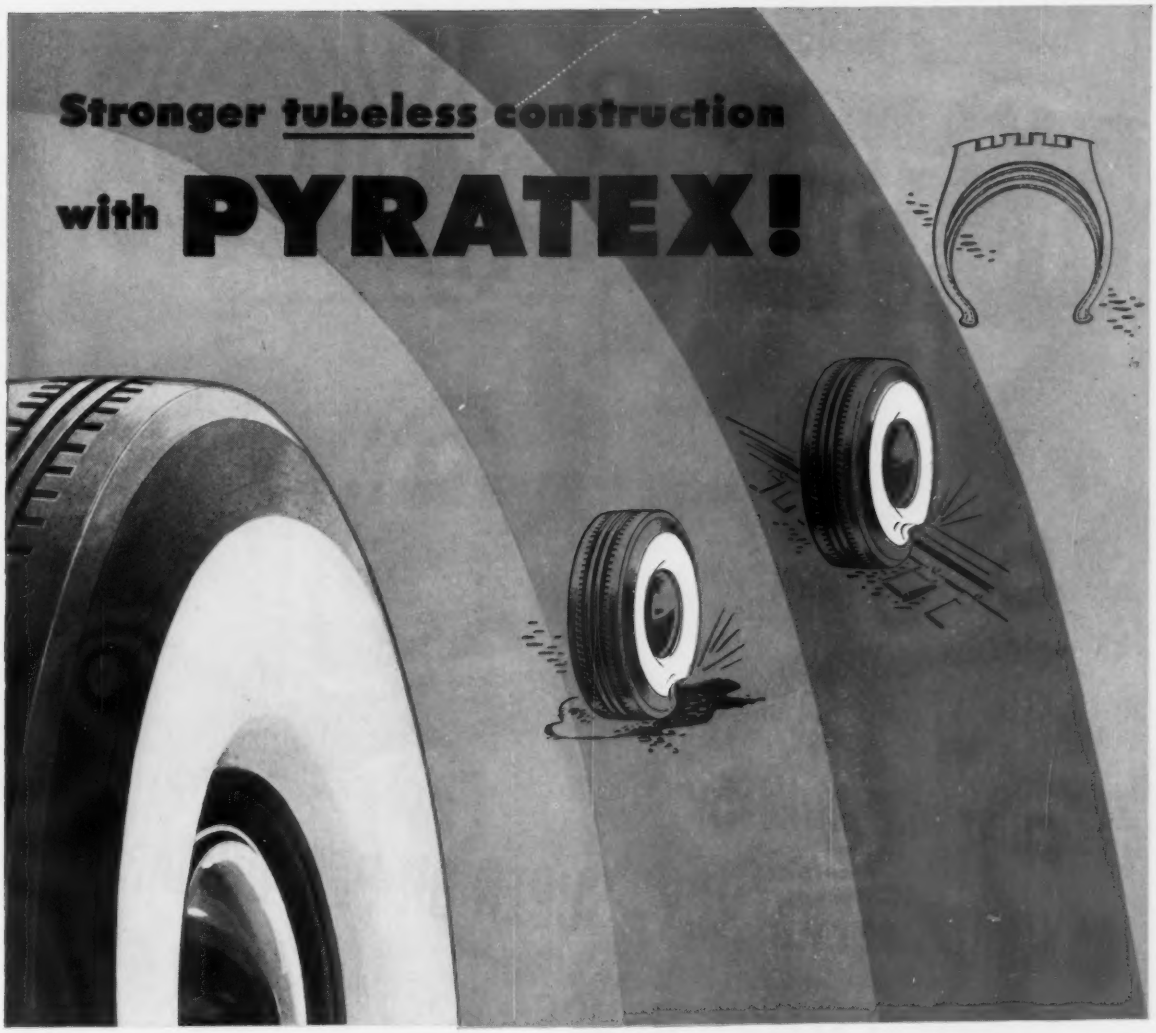
RUBBER AGE



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A vinyl pyridine latex developed by Naugatuck, Pyratex will increase fatigue resistance and reduce ply separation in *all* reinforced rubber products. For superior performance in *your* automobile, bus, truck or airplane tires, V-belts, conveyor belts, or any other reinforced rubber product, *try Pyratex*. It is available for further compounding, or as a Lotol®, custom-compounded and ready for use.

For more information about how Pyratex can help improve *your* reinforced rubber products, write to us on your company letterhead, today.

PYRATEX...

- secures cord to rubber with a grip stronger than the stock itself
- keeps its outstanding adhesion under high-speed flexing and heat
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- greatly reduces "curing blows"
- has a higher solid content, for more convenient use

United States Rubber

Naugatuck Chemical Division

Naugatuck, Connecticut

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designed and built for

MAXIMUM EFFICIENCY–SUPERIOR PERFORMANCE –MINIMUM MAINTENANCE

This extra heavy duty 60″ streamlined mill is designed and built in every detail to provide dependable uninterrupted production under the rigorous service conditions encountered in the Rubber and Plastics Industries.

Built-in herringbone gear speed reducers, with anti-friction roller bearings, insure proper alignment with master gear and pinion at all times. Fully enclosed frames and guards keep cleaning and maintenance costs down.

Thropp 42″, 50″, 72″ and 84″ mills for the Rubber and Plastics Industries are also available.

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A LIQUID ACCELERATOR FOR LATEX— NATURAL and SYNTHETIC

- SIMPLIFIES LATEX COMPOUNDING
- ADD DIRECTLY TO LATEX
- NO GRINDING OR BALL MILLING NECESSARY

Merac Offers these Advantages:

1. It is a liquid accelerator which upon dilution with water is added directly to latex.
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the name to watch in petrochemicals

Petro-tex came actively into being in April, 1955 with the acquisition of the facilities of the Government's Houston butadiene plant. Today, more than 50% expansion of capacity is well along to keep pace with the surging demand for rubber and to provide a surplus for new butadiene applications.

Alertly manned with experienced personnel and constructively at work on new markets, Petro-tex is the name to watch in butane-derived petrochemicals. We will welcome the opportunity to discuss your needs.

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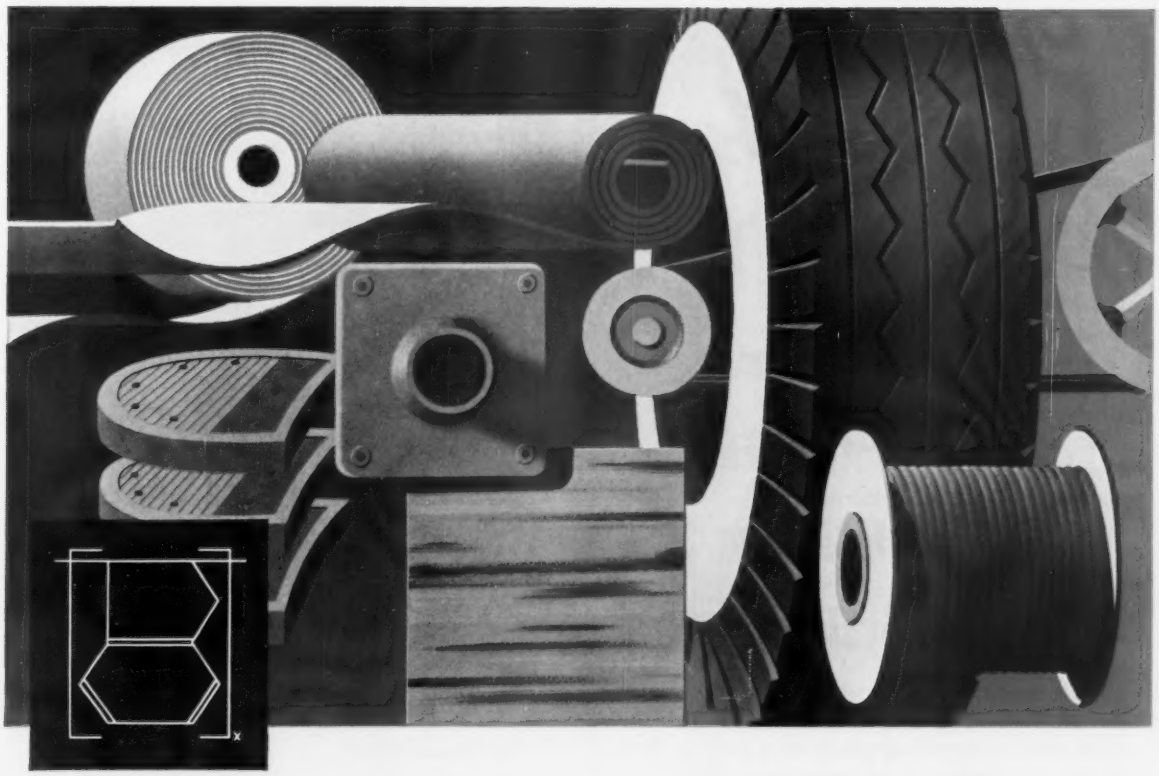

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Coumarone-indene resins by Neville have become standard in the processing of rubber for an ever-increasing variety of products in ever-greater volume throughout the years. Here's why. Users find that Neville gives them constant good quality and fast service, and they save production time and costs and produce better products when they use coumarone resins. Also, Neville has a broad variety of these ideal extender-plasticizers in various grades and melting points to suit every product need. Our chemists will gladly assist yours in selecting the proper one for your purpose. Use the coupon to write for further information.

Neville Chemical Company, Pittsburgh 25, Pa.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50 W Hi-Flash, Wire Enamel Thinners.

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PLASTICIZER TP-90B

Yields Maximum Low Temperature Flexibility and Maintains Excellent Physical Properties

"Thiokol" Plasticizer TP-90 B is an efficient low temperature plasticizer. Even at high concentrations it does not appreciably impair the physical properties of the compounds in which it is used.

"Thiokol" Plasticizer TP-90 B is highly compatible with natural rubber, Neoprene nitrile-type rubbers and GR-S. It imparts excellent low temperature flexibility to these elastomers and maintans high resilience over a wide temperature range.

The following results illustrate how "Thiokol" TP-90 B yields excellent low temperature flexibilities while still maintaining the physical properties:

	Natural Rubber	Neoprene GN	Hycar OR-15	Paracril-B	GR-S
TP-90B, p. h. r.	30	20	30	30	30
Cure, min. /° F.	30/310	45/300	30/310	30/310	30/310
Tensile, p. s. i.	2200	2600	2380	2250	1500
Elongation, %	530	410	300	350	380
Shore Durometer	42	68	70	61	45
Low Temperature Flexibility**	**–95°F**	**–70°F**	**–70°F**	**–80°F**	**–95°F**

****Determined according to a modification of ASTM method D 1043-49T. The temperatures shown are the values at which the absolute torsional moduli are 10,000 p. s. i. Although the specimens were still quite flexible, G10,000 was arbitrarily chosen as the stiffening point.**

For technical information and samples, write:

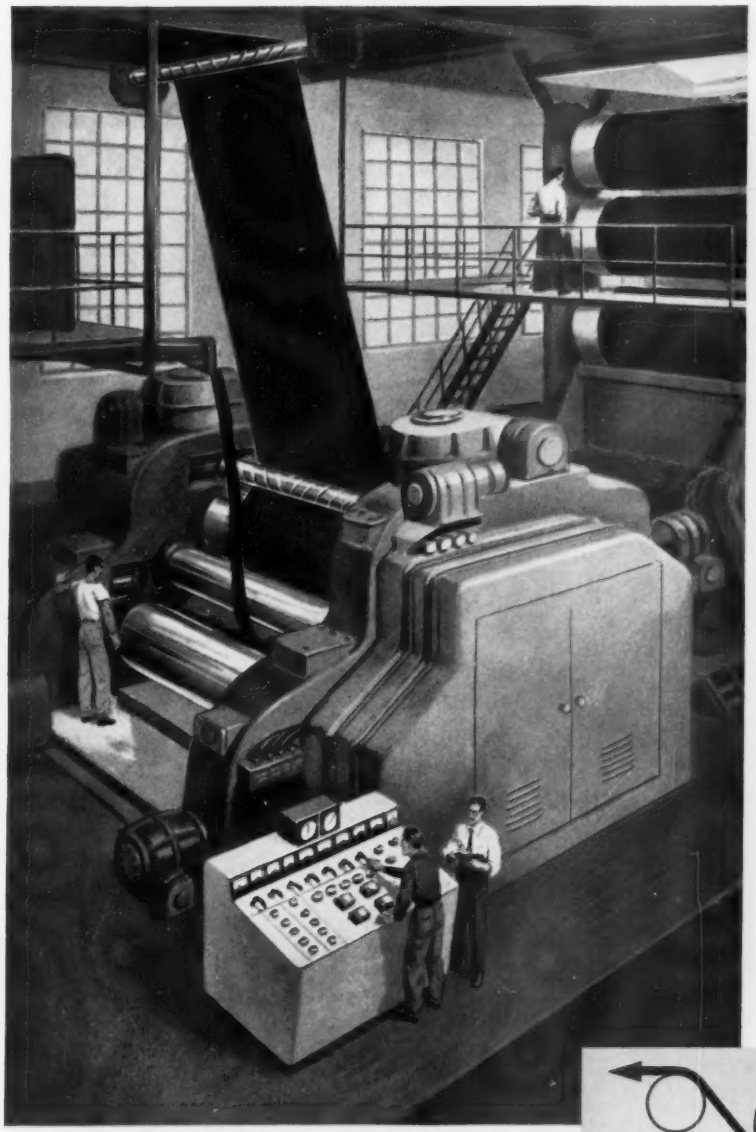
This information is believed to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data, or the use of this product.

Thiokol Chemical Corporation

784 NORTH CLINTON AVENUE • TRENTON 7, NEW JERSEY

In Canada: Naugatuck Chemicals Division, Dominion Rubber Company, Elmira, Ontario

How you can double-coat 80 miles of tire fabric a day---*evenly*---*accurately*



*The "Z" calender is an original development of Farrel-Birmingham Company, Inc. When you think of the "Z" calender you are thinking of Farrel-Birmingham.

The giant "Z" calender* you see in operation at the left, was designed by Farrel-Birmingham for a production speed of 100 yards per minute. That means this machine can double-coat 80 miles of tire fabric in 24 hours.

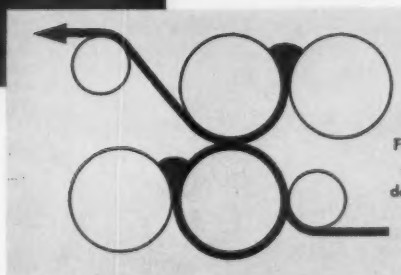
More important is the calender's ability to apply rubber coating evenly to both sides at the same time and across the full width of the fabric, under constant weight and tension, with unmatched uniformity.

To provide this accuracy, both the upper and lower roll pairs of the calender are equipped with motorized crossed-axes devices for fine adjustment of roll "crown." Roll adjustment by individual motor for each screw of the three adjustable rolls permits extremely precise settings. Hydraulic pullbacks hold the rolls in positive operating position.

Double-coating of tire fabric is just one of the jobs in which F-B "Z" calenders are establishing new standards for accuracy. They are equally outstanding for the high-speed production of rubber and plastic film and sheet and for single coating. Send for more information on the revolutionary "Z" calender.

FARREL-BIRMINGHAM COMPANY, INC.
Ansonia, Connecticut
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Fayetteville (N. C.), Los Angeles, Houston

FB-993



Flow of stock and fabric in double-coating operation.

F-B PRODUCTION UNITS

Banbury Mixers • Plasticators • Pelletizers • Extruders • Calenders • Mixing, Grinding, Warming and Sheeting Mills • Refiners • Crackers • Washers • Hose Machines • Bale Cutters • Hydraulic Presses and Other Equipment for Processing Rubber and Plastic Materials.

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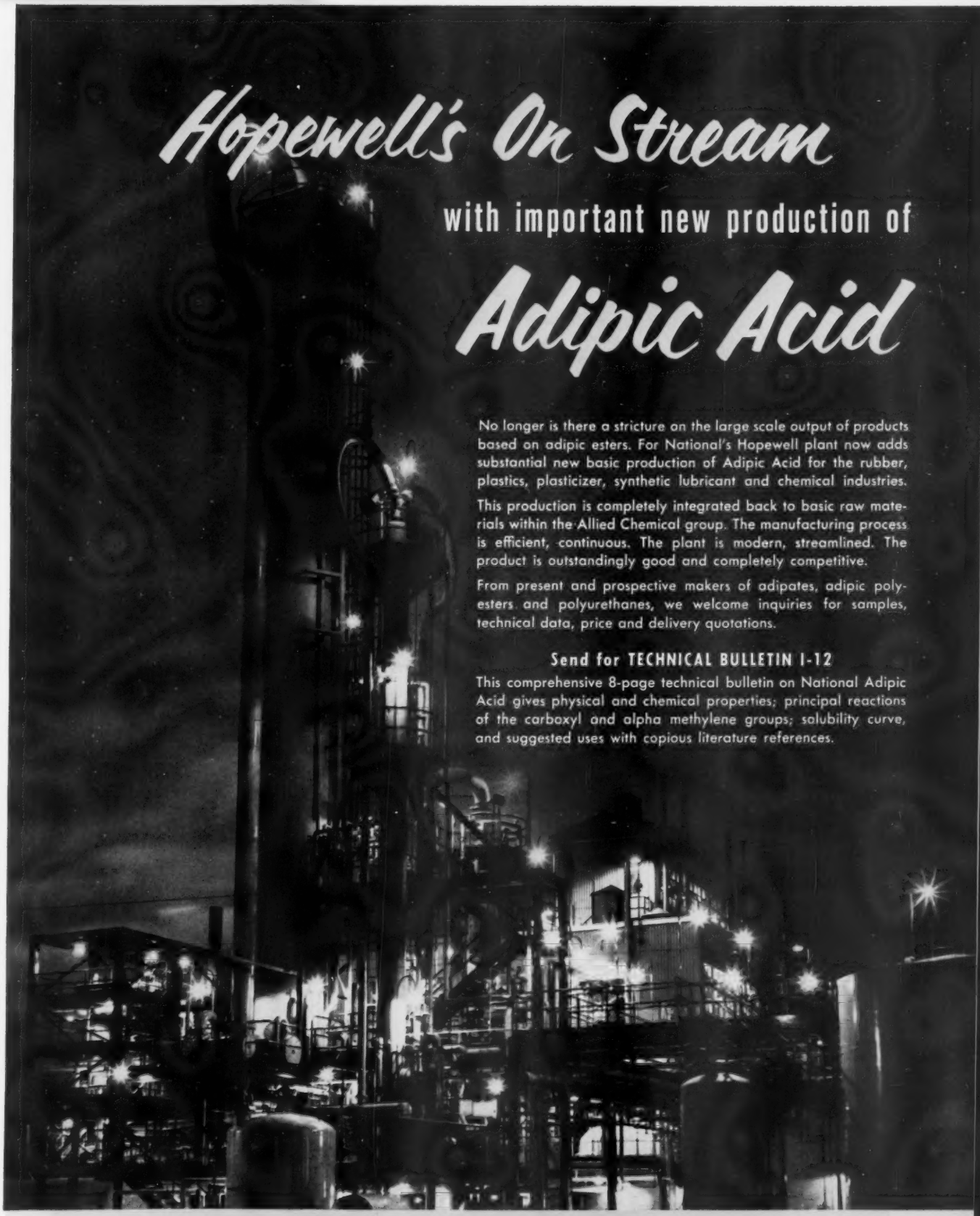
Hopewell's On Stream

with important new production of

Adipic Acid



No longer is there a stricture on the large scale output of products based on adipic esters. For National's Hopewell plant now adds substantial new basic production of Adipic Acid for the rubber, plastics, plasticizer, synthetic lubricant and chemical industries.

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Send for TECHNICAL BULLETIN I-12

This comprehensive 8-page technical bulletin on National Adipic Acid gives physical and chemical properties; principal reactions of the carboxyl and alpha methylene groups; solubility curve, and suggested uses with copious literature references.

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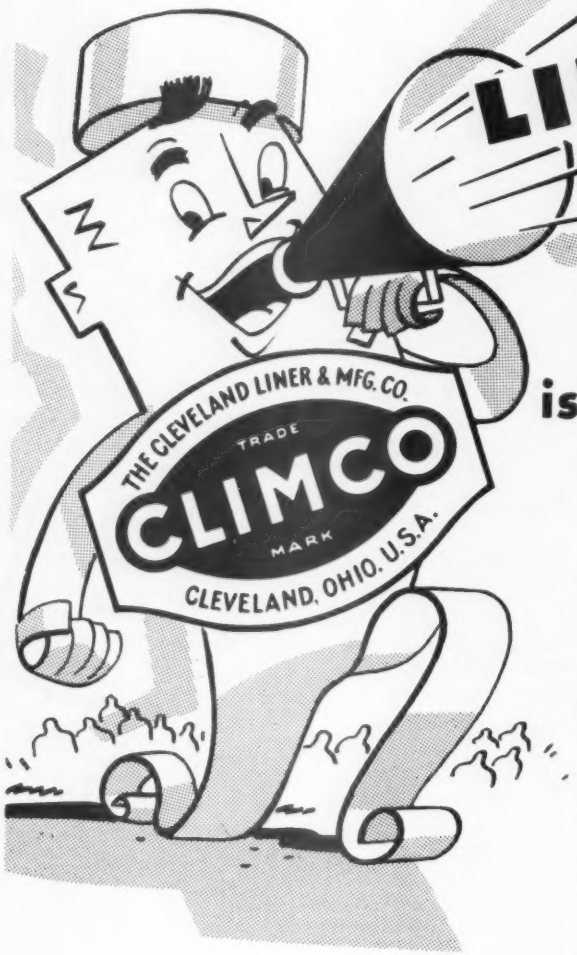

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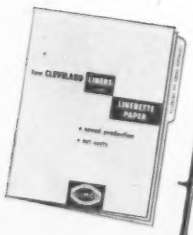

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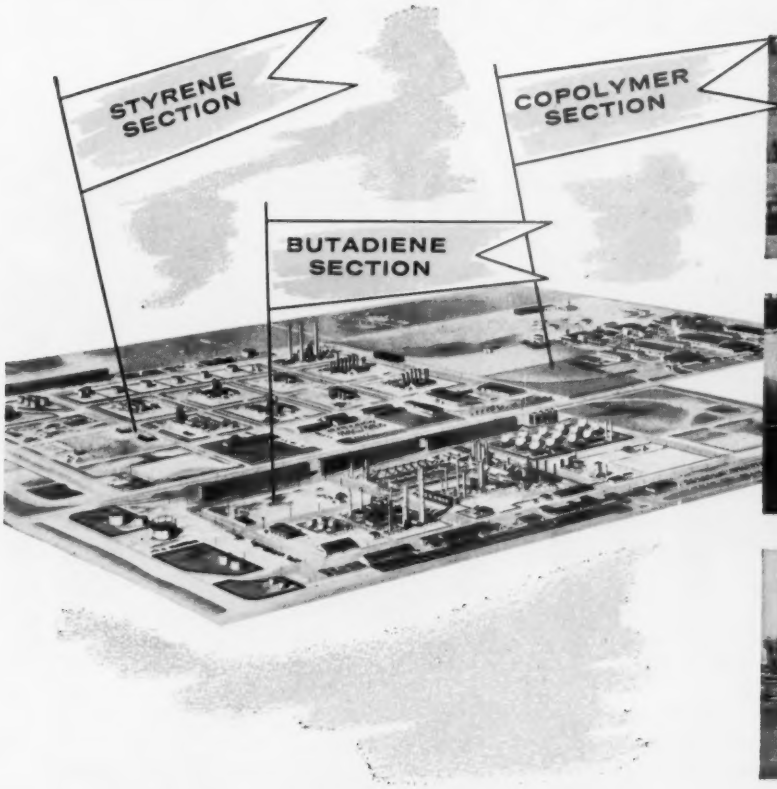

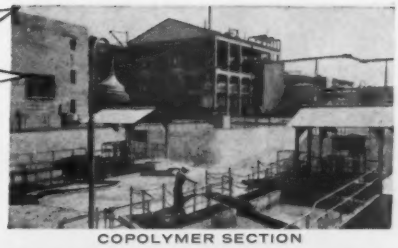
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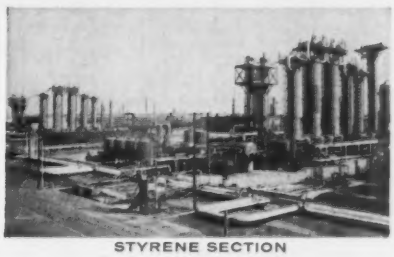
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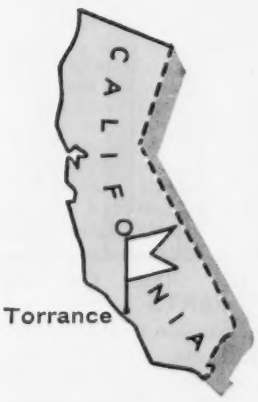
Synthetic Rubber



Shell Chemical offers a wide line of general-purpose polymers

Torrance, California, deserves a big star on your map of rubber sources. It's the home of Shell Chemical's synthetic rubber plant . . . one of the nation's best equipped for the production of a variety of types of butadiene-styrene rubber.

Whether you need a bale or a carload . . . for sheeting, molded goods, extruded goods, tires or other uses, Shell Chemical can fill your requirements.

Our technical staff will be glad to discuss your needs. Phone or write Synthetic Rubber Sales Division, P.O. Box 216, Torrance, California. Phone FAculty 1-3710 or DAvis 4-4991.

SHELL CHEMICAL CORPORATION

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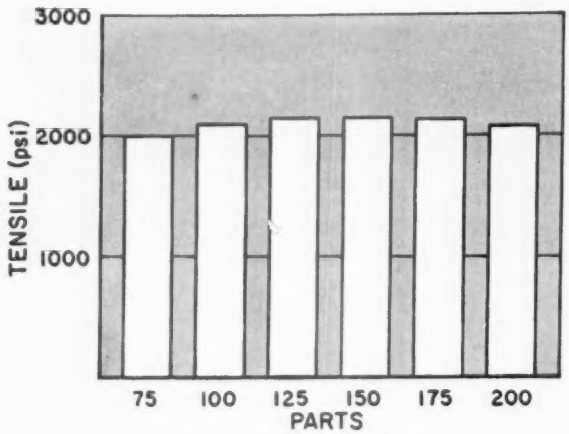
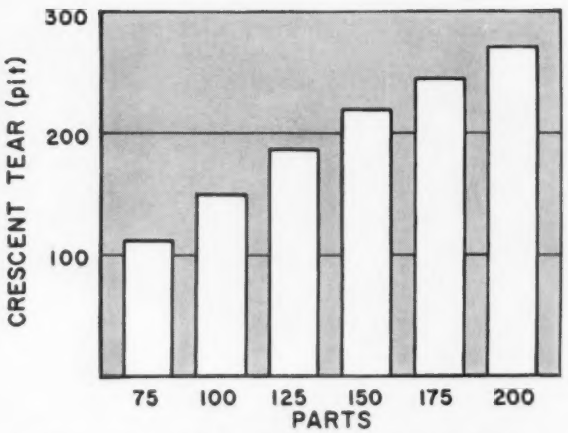
SHELL

See how you can give GR-S

high tear resistance / tensile strength

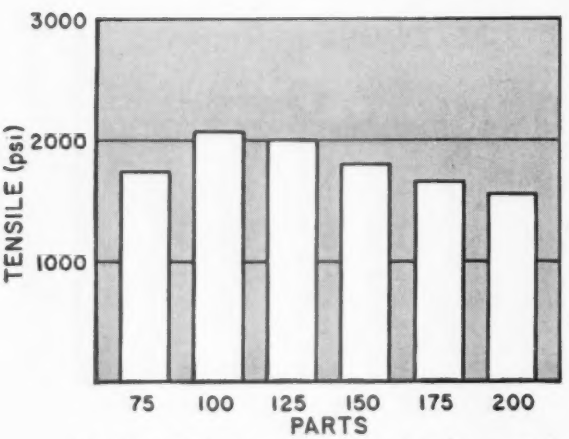
with Super Multifex®

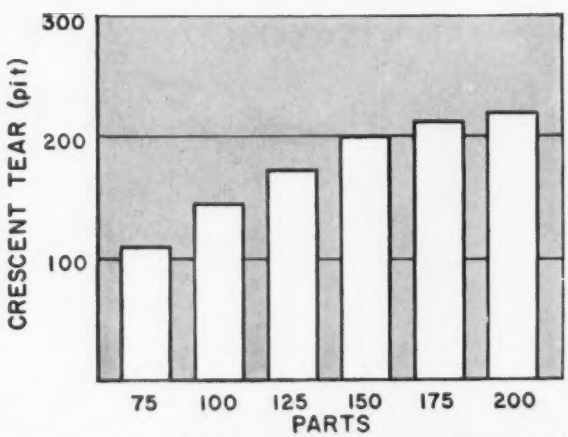




Use DIAMOND Super Multifex in your GR-S compounds for maximum tear resistance, high tensile strength, and excellent flex life. This precipitated calcium carbonate has extremely uniform, ultra-fine particles (.03-.04 microns), coated to aid dispersion, mixing and processing. Try it in your next order.

and Multifex® MM





Multifex MM is an uncoated, ultra-fine particle (.05–.06 microns) precipitated calcium carbonate. It reinforces GR-S by giving good tear resistance, tensile strength and flex life. Call your DIAMOND representative today for information and technical help on these and other high-grade calcium carbonates. Or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

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HOW GOODYEAR CUTS AUTO SEATS and BACK PADS on a FEMCO Roller DIE CUTTER

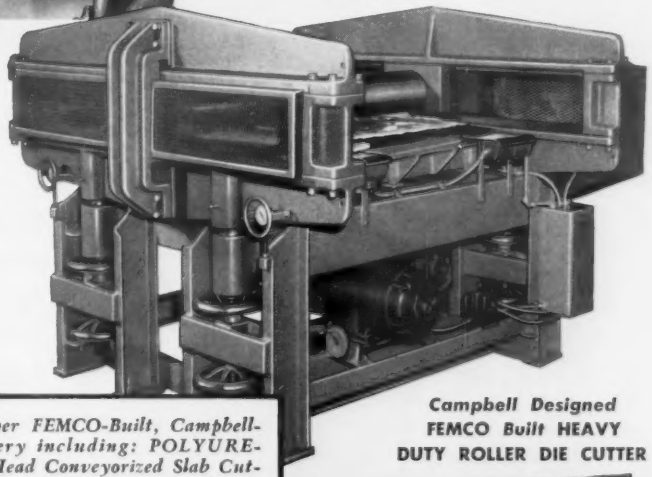
IN the Goodyear Tire & Rubber Company's Airfoam operation in Plant C, Akron, Ohio, a great production job is being done die cutting auto seats and back pads (the upright part of car seats) which are made of Airfoam.

Goodyear turned to the Falls Engineering (FEMCO) Roller Die Cutter when they began the operation. (See pictures at left). Dies are placed on the bed of the FEMCO machine and big Airfoam slabs are placed on top of the dies. Then the machine's power driven roller moves over the Airfoam slabs and makes multiple cuts, neatly and accurately. The trimmings are easily removed and the parts stacked.

Goodyear solved this production job with a FEMCO Roller Die Cutter. What are *your* die cutting problems? Write us, and send samples of your stock to be die cut and a full report submitted without obligation.

FEMCO'S Campbell designed Heavy Duty Roller Die Cutter uses inexpensive steel rule dies and keeps original die costs to a minimum. It provides an accurate method of die cutting materials with less manpower and less time than ever before.

The Roller Die Cutter is available in the following bed sizes: 48" x 42"; 60" x 36"; 48" x 72"; 72" x 48"; and 72" x 66". Some of the material this machine will die cut includes Foam Rubber, Rubberized Hair, Felt, Textiles, Automotive Rubber Products, Polyvinyl, Polyester and Polyurethane materials; Fiberglas, Rubber Coated stock, Rubberized Cork, Sponge Rubber and other materials.



Campbell Designed **FEMCO *Built* HEAVY DUTY ROLLER DIE CUTTER**

Inquire about other FEMCO-Built, Campbell-designed machinery including: POLYURETHANE Double Head Conveyorized Slab Cutter; POLYURETHANE Leveling and Splitting Machine; also Foam Rubber Splitters and Cushion Cutters.

FEMCO'S V-BELT EQUIPMENT

Includes Collapsible and Ring Molds, Curing Cages, Autoclave Type Belt Molders, Hydraulic and Manual Manipulators, Vertical and Horizontal Type Measuring and Matching Machines, Notching Machines, the new and improved V-Belt Skiving Machine, and a new and improved V-Belt Collapsible Building Drum. Call us first for this equipment.

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Smudging white sidewall tires is a woman's prerogative. And if you make white walls, it's *your* prerogative to whiten them with TITANOX-A (anatase titanium dioxide).

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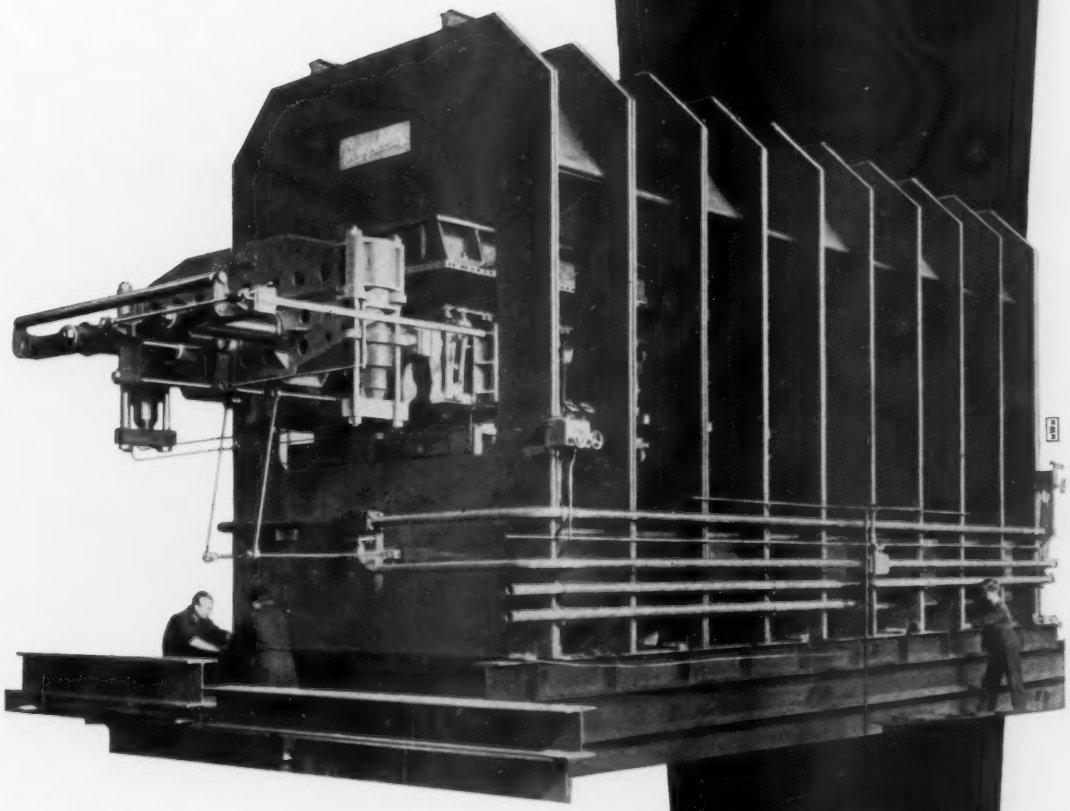

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Dimensions up to 10 feet wide by 50 feet long

The leading rubber factories in Europe use Siempelkamp belt presses.

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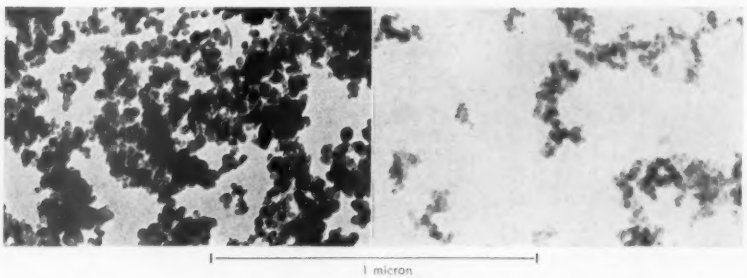
Palletized loads can be stacked in your warehouse, two-high, with ease. You save valuable storage space and materials-handling manpower. Order from Witco-Continental today and save.

Witco—Continental packaging and materials-handling engineers are available for consultation on any specific problem in the further development of materials-handling technique.

And NOW... **CABOT Cab·o·sil®**

The **SAF** *of the Silica Pigments*



Electron Micrograph of Vulcan 9 (SAF) Carbon Black at 50,000 X

Electron Micrograph of Cab-o-sil Colloidal Silica at 50,000 X

Cab-o-sil®, with a finer particle size (0.015-0.020 micron) than even the finest of rubber reinforcing carbon blacks (0.023 micron), has been called the SAF—Super Abrasion Furnace—pigment of the silica field. Cab-o-sil, unique in many respects, is manufactured by a flame process similar to that used for the highly reinforcing (SAF) carbon blacks, and not by an aqueous precipitation process. Fine particle size, with exceptionally high external surface area, results in remarkable stiffening of uncured stocks. Cab-o-sil's remarkable properties include

High Chemical Purity

Extremely Fine Particle Size

Enormous External Surface Area

Unusual Optical Properties

Clean White Color

Startling improvements in rubber—not possible with precipitated silicas, silica gels and aerogels—are realized with the use of only small quantities of Cab-o-sil. Improvements include

Outstanding Tensile Strength

High Elongation

Excellent Tear Resistance

Exceptional Hardness at Low Loadings

Minimum Cold Flow of Uncured Stocks

Good Dielectric Properties

Low Water and Moisture Absorption

TESTED and USED in

Butyl Rubber . . . 5-15 parts of Cab-o-sil per 100 parts of rubber improve the electrical, weather aging and mechanical properties. Due to the low water adsorption of Cab-o-sil, resistance to change of electrical properties after long periods of immersion is especially good. Low loadings can minimize cold flow while helping the extrudability of the stock.

GR-S . . . Light colored compounds containing 5-10 parts of Cab-o-sil and 100 parts of clay per 100 parts of rubber give excellent abrasion and tear resistance.

Neoprene Latex . . . 5-10 parts of Cab-o-sil per 100 parts of rubber substantially increase tensile and tear strength and abrasion resistance in neoprene latices. Dipping operations are more efficient due to reduced drainage time and increased stability of the filled latex. Dispersions of Cab-o-sil in neoprene latices used for dipping operations result in superior tear resistance, higher abrasion resistance and, by reducing drainage, permit the deposition of thicker films.

CHEMICAL and PHYSICAL PROPERTIES

Silica Content (Moisture-Free Basis)	*99.0 - 99.7%*
Free Moisture (105°C.)	*0.2 - 2.0%*
Ignition Loss (1000°C.)	*0.2 - 1.0%*
CaO, MgO	*0.00%*
Fe_2O_3	*0.004%*
Particle Size Range	*0.015 - 0.020 micron*
Surface Area (Nitrogen Adsorption)	*175 - 200 $m.^2/gm.$*
Specific Gravity	*2.1*
Color	*White*
Refractive Index	*1.55*
pH (10% Aqueous Dispersion)	*4.5 - 6.0*
Apparent Bulk Density (Compressed Grade)	*6.0 - 6.5 lbs./cu. ft.*

Cab-o-sil is available in commercial quantities. Send now for a free sample and the bulletins describing Cab-o-sil applications.

CABOT WHITE PIGMENTS DIVISION RA **GODFREY L. CABOT, INC.** 77 FRANKLIN ST., BOSTON 10, MASS.

Please send Cab-o-sil® sample and

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- ☐ *Aqueous Dispersions of Cab-o-sil (#cmis-2)*
- ☐ *General Properties, Functions and Uses (#cgen-1)*
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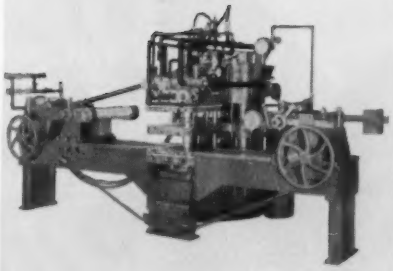
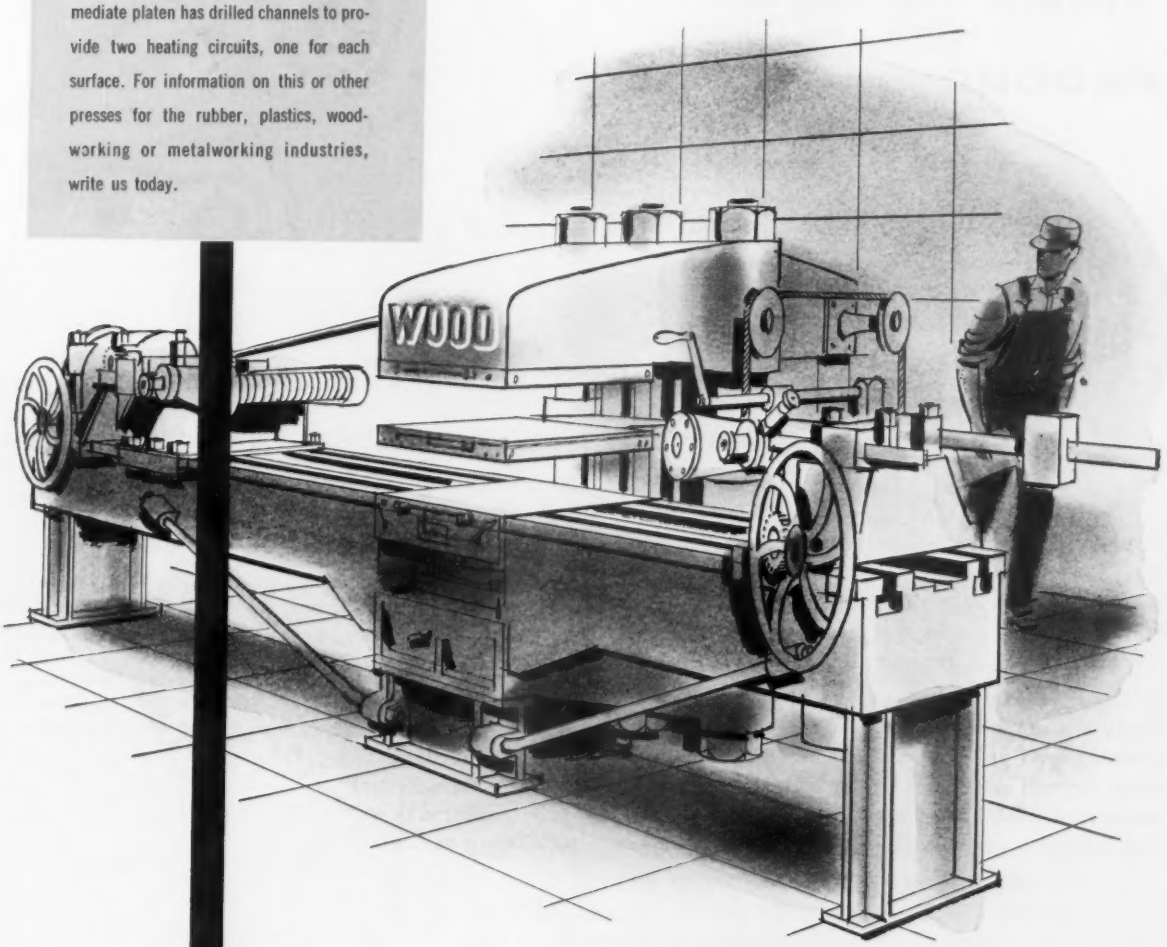


Open Gap 47-Ton Belt Press for curing flat and V-type transmission belts. The moving platen is accurately machined from a rolled steel slab and is guided by long, full-round babbitted guides on the strain rods. Intermediate platen has drilled channels to provide two heating circuits, one for each surface. For information on this or other presses for the rubber, plastics, woodworking or metalworking industries, write us today.

Prelude to low-cost production

When an R. D. Wood press swings into action, gratifying things happen to production costs. For, in most cases, production climbs to a new high and down-time for repairs approaches zero. The reason is the smooth, dependable performance of R. D. Wood presses—even under difficult conditions. And the reasons for this superior performance are the exacting standards set by R. D. Wood—in design, selection of materials, and craftsmanship. If your company's theme is low-cost production, here is your prelude—ready made.



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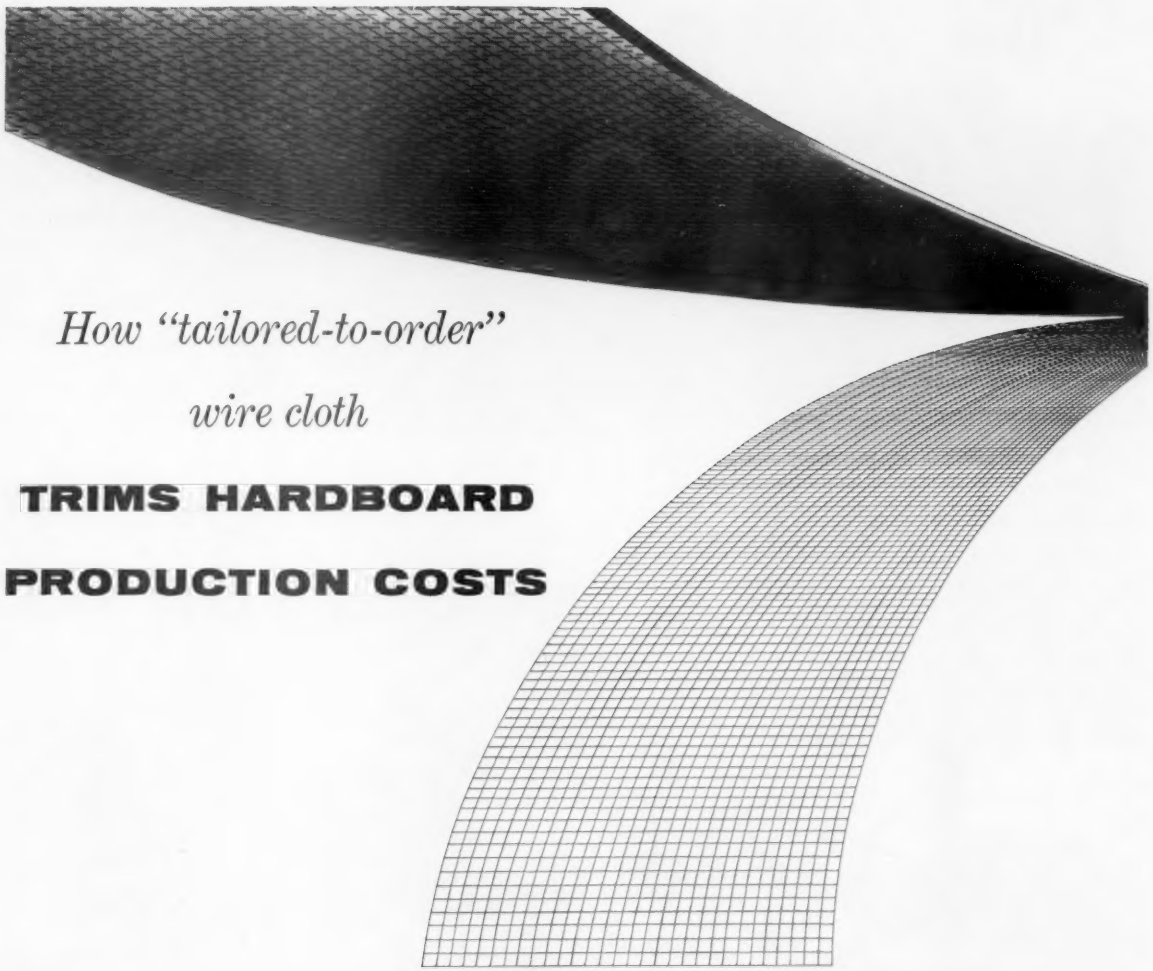

How "tailored-to-order"

wire cloth

TRIMS HARDBOARD

PRODUCTION COSTS

• There's a tell-tale pattern on the back of a leading brand of hardboard. It was left there by a *new* kind of wire cloth, developed by the *Reynolds Wire Division* of National-Standard—developed because their customer had a problem which, as usual, Reynolds solved.

In this hardboard manufacture, wire cloth carries the heavy wet compound, supports the material during pressing, and pulls out the hardened boards, while being stripped away from the big boards by force. The stress is terrific! In fact there *was* no wire cloth that would hold up. It failed too often, requiring frequent replacement, slowing production and adding to costs.

But now all that is past . . . because Reynolds tackled the problem and came up with a radically new cloth construction. So unusual was the cloth that Reynolds even had to build special looms to produce it.

Here again is an example of the lengths to which Reynolds *often* goes to help customers save money, produce better products, or both! But problem or no problem, if you *use* wire cloth, or want to check on its use, you'll find Reynolds' kind of service and cooperation always pays off. Try us and see.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

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Tire Wire, Stainless, Fabricated Braids and Tape

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Split end frames for unrivalled accessibility.

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Your production program demands that you look into the advantages of Bolling Spiral-Flow Intensive Mixers. They are powered with Bolling's sensational compound drives which transmit power directly to both rotors. All external gearing is eliminated. Applications which call for double the usual power output are readily solved. Higher rotor speeds and chamber pressures improve dispersion and cut mixing time. You get maximum power in much less space.

Designed for tomorrow's speeds and pressures, Stewart Bolling mixer drives are ready to go to work for you today. We offer four production sizes and a practical laboratory size.

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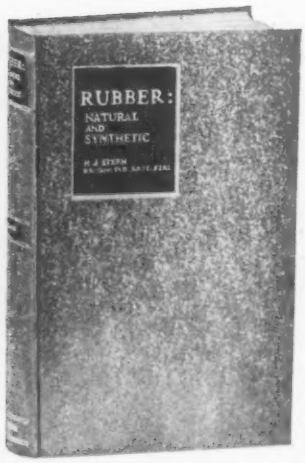

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By H. J. STERN

B.Sc., Ph.D., A.R.I.C., F.I.R.I.

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About the Author—

Dr. Stern has been engaged as a chemist in the rubber industry for more than 25 years and since 1935 has practiced successfully in London as a Consultant. He is the author of "Practical Latex Work" and of many publications concerned with the scientific and technological aspects of natural and synthetic rubber.

SUMMARY OF CONTENTS BY CHAPTERS

Part I

1. **Historical Introduction; Mastication; Vulcanization.**
2. **Plantation Rubber.**
3. **Natural Rubber: Composition, Reactions, Derivatives.**
4. **Properties of Vulcanized Rubber.**
5. **Compounding Ingredients.**
6. **Rubber Machinery; Solvents and Solutions; Reclaiming.**
7. **Latex.**

Part II

8. **Synthetic Rubber (History and Development).**
9. **Manufacture and Technology of Synthetic Rubbers.**
10. **Synthetic Rubber Latices.**
11. **Synthetic Resins; Plastics.**
12. **Manufacturing Processes (of various rubber products).**
13. **Testing and Analysis.**

Sources of Further Information; Metric Equivalents; Subject Index.

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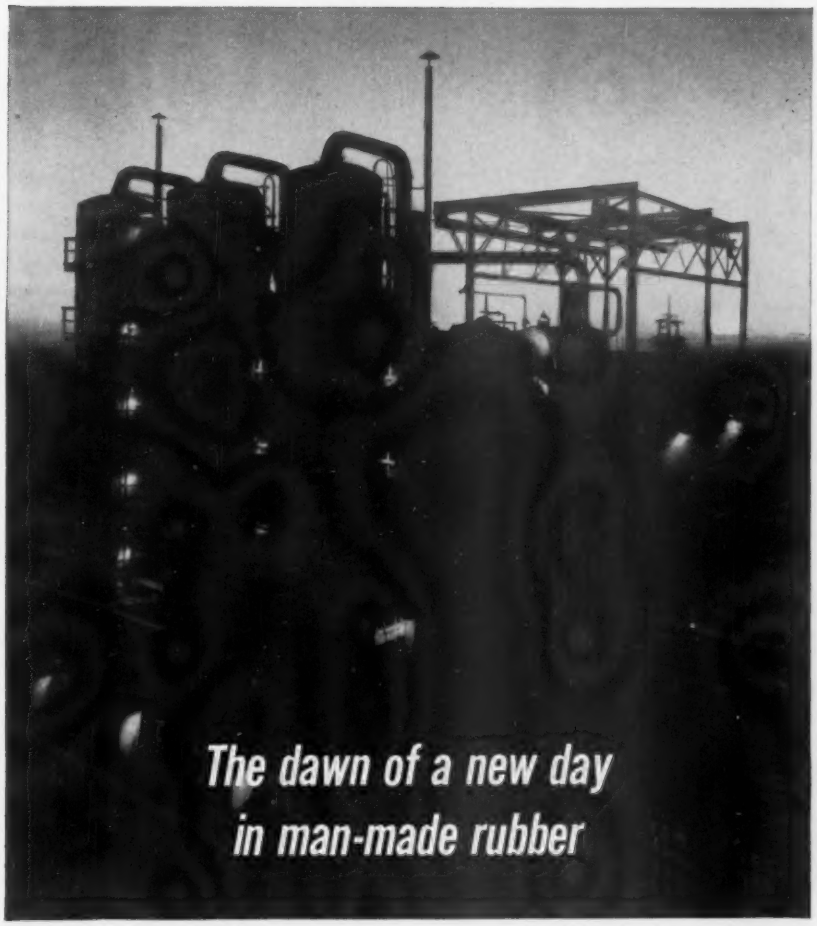

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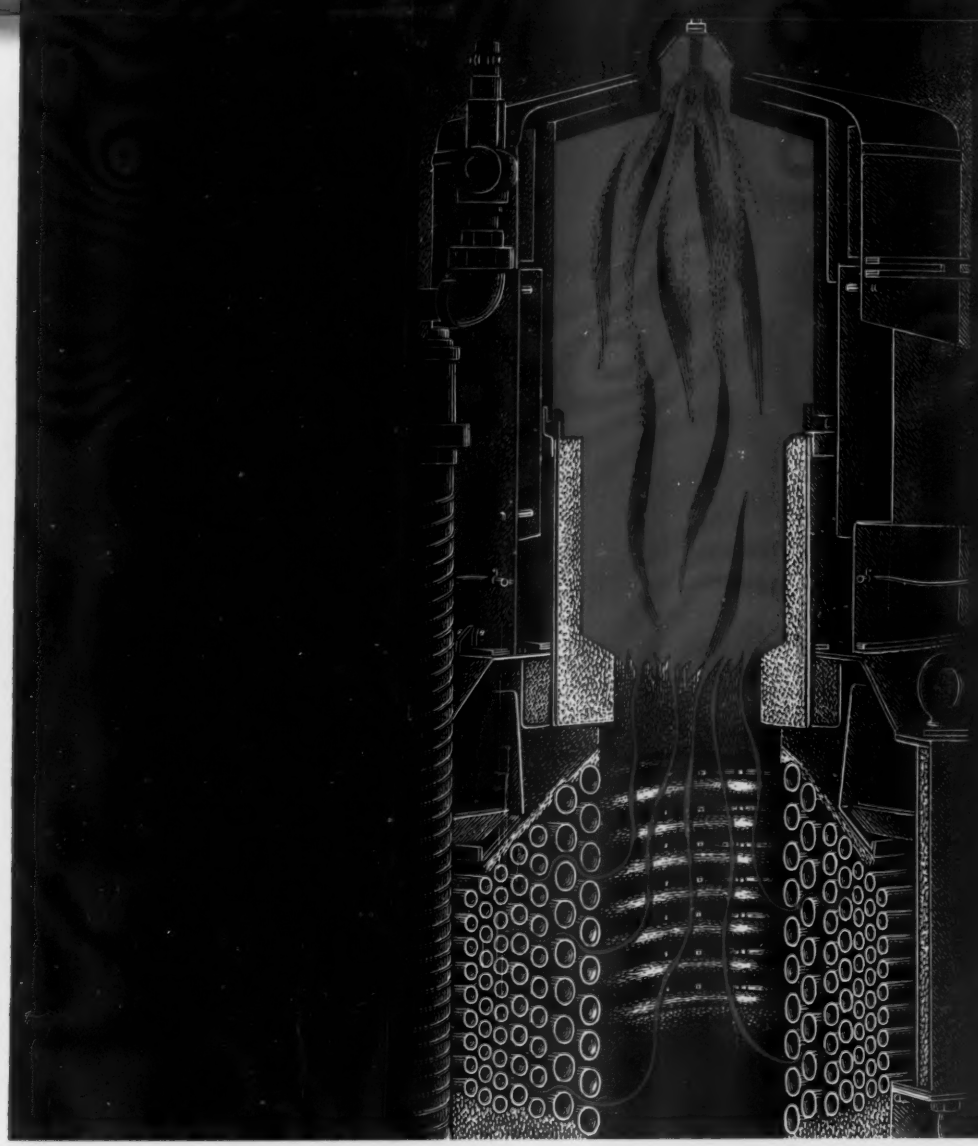
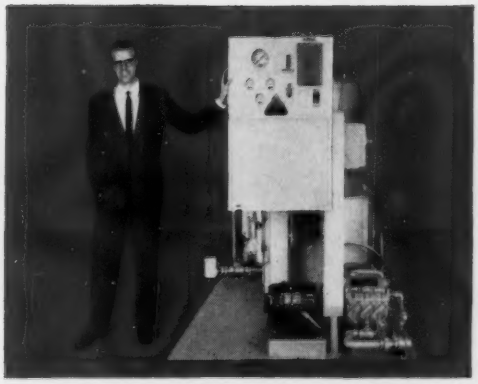


more steam, faster steam in less space



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"A" can be adjusted to any required opening by setting limit of ram travel.

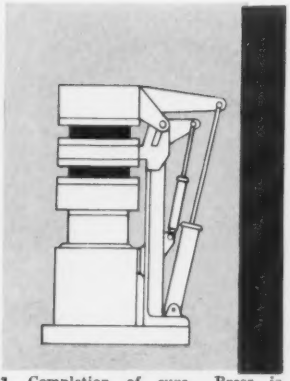
"B" and "C" openings can be adjusted by movement of intermediate platen or transfer mold.

NOW

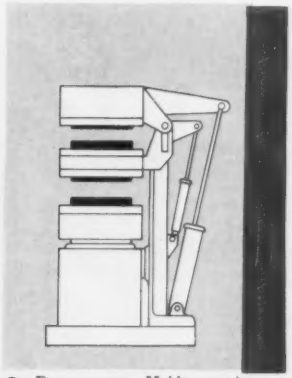
Above photo is a two deck or two opening press. However, the intermediate platen is a transfer mold and the plunger plate replaces the usual mold fastened to tilting head.

The tilting head design is not new. There are many tilting heads in operation with service records of 15-20 years. However, the two opening design is new.

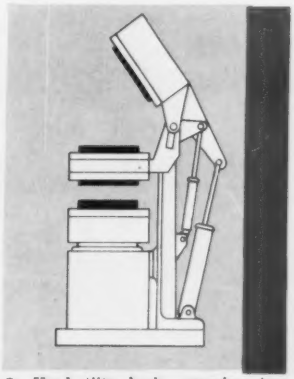
ONLY THE MATERIAL MOVES IN AND OUT



1. Completion of cure. Press is ready to open.

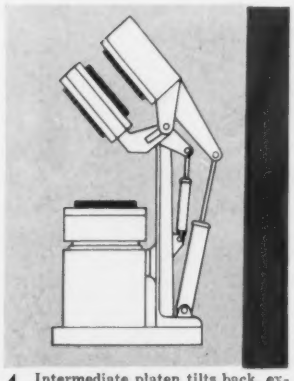


2. Press opens. Molds remain parallel during entire stroke of ram. This is necessary for deep cavity molds.

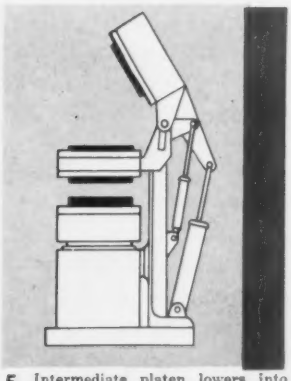


3. Head tilts back, exposing two halves of mold in top deck—cured articles are removed.

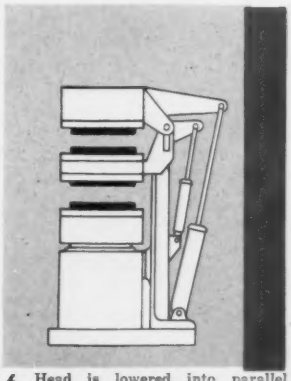
A TWO-OPENING TILTING HEAD PRESS



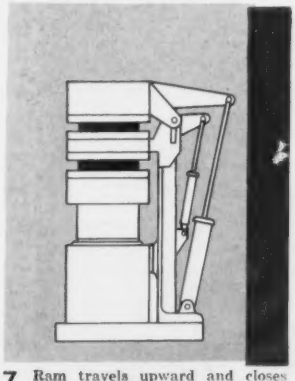
4. Intermediate platen tilts back, exposing two halves of mold in lower deck. Cured articles are removed. Fresh unvulcanized stock is placed in mold cavities.



5. Intermediate platen lowers into parallel position — unvulcanized stock is inserted in mold cavities.



6. Head is lowered into parallel position.



7. Ram travels upward and closes press. DIRECT AND FULL PRESSURE OF HYDRAULIC SYSTEM IS AVAILABLE THROUGHOUT ENTIRE STROKE OF RAM.

- Only the material moves in and out of the press. Molds remain in press, therefore mold halves **stay in register.**
- Cures two sets of molds at the same time.
- Timer, at prescribed intervals, automatically raises and lowers the ram, tilt head and intermediate platen.
- One operator, male or female, can attend to approximately as many presses as there are minutes in cure time. The operator simply removes cured articles and replaces with uncured, pre-formed stock.
- Press Sizes: 24-32-36″—up to 1,000-ton pressure.
- Two Opening Press can be used as a single opening press for extremely deep molds.

OF THE TILTING HEAD

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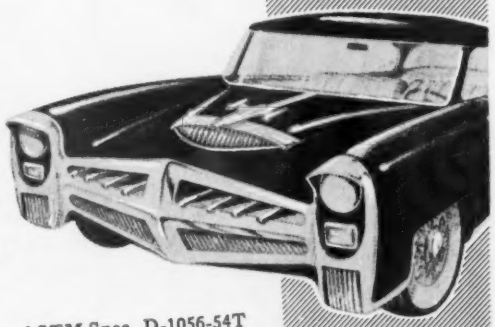

TEST DATA	A-550-1 R-11	A-550-1 R-12	ASTM Spec. D-1056-54T R-11	ASTM Spec. D-1056-54T R-12
Sponge Density (lbs./cu. ft.)	28	32	....	....
Sample Thickness (inches)	5/8	5/8	....	....
Cure @ 312° F. (min.)	15	15	....	....
Deflection Before Aging (psi.)	2¾	6¾	2-5	5-9
Deflection after 7 days Oven @ 158° F.%	+18	+7½	±20	±20
Compression Set Method B%	12½	14	15 max.	15 max.

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Some of the sponge-rubber products for which Pequanoc #2550 is recommended in the automotive industry are door headers, arm rests, trunk weather stripping, shims, grommets, sheeted sponge and now . . . the very latest . . . dashboard crushpads for greater passenger protection. Tell Pequanoc about your sponge-rubber problems. Write today for further information and learn about the contribution #2550 can make to your formula.

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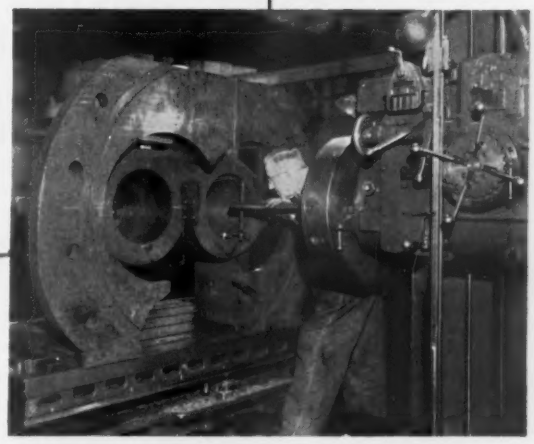

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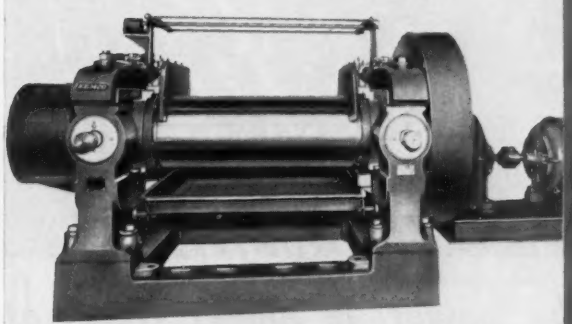

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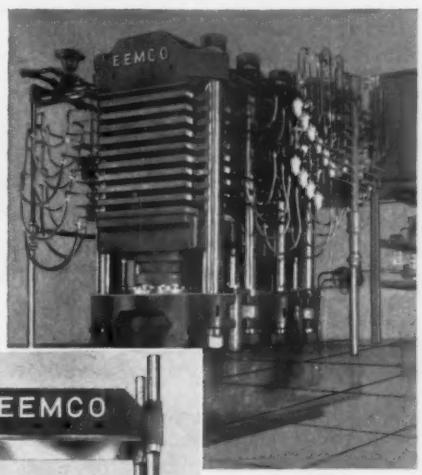

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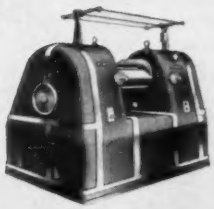

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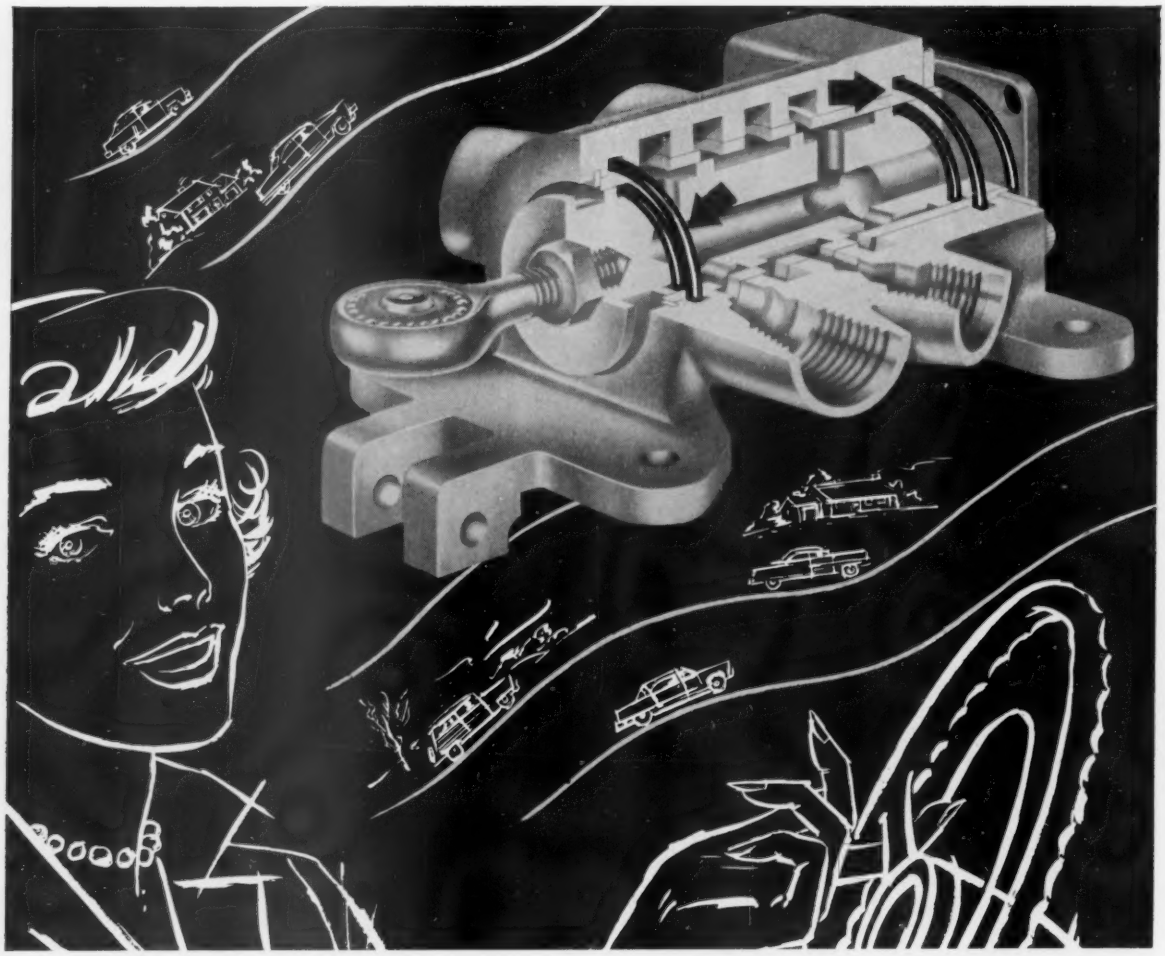

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Rubber Age

Vol. 78, No. 5 FEBRUARY, 1956

The Morphology of New Synthetic Elastomers

By ERNST A. HAUSER

Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

DURING the past several years considerable work has been done by the rubber industry and by university researchers on the development of new synthetic elastomers and of catalysts to permit quick and simple polymerization of the monomer or monomers involved. Reports on some of the chemical and physical properties of these new products have already been published, but so far little, if any, attention has been paid to their morphology. It was therefore decided to evaluate the morphology of some of these substances for comparison with the morphology of other known natural and synthetic elastomers.

The methods employed for this type of study have been reported in several previous publications *(1, 2)* and for that reason it is not considered necessary to discuss them again. Electron microscopic as well as ultramicroscopic studies were carried out.

The results already available clearly indicate that it is now possible to produce a new isoprene-based product whose morphology corresponds to that exhibited by natural rubber. It is also possible to demonstrate that the morphology of a butadiene polymer or copolymer obtained by the use of a special catalyst shows a far greater similarity to that of natural rubber than standard butadiene polymers or copolymers have so far exhibited.

Recent New Polymers

In a recent paper *(5)* and in information given the author *(6)*, Dr. F. W. Stavely, Director of the Chemical and Physical Research Laboratories of the Firestone Tire and Rubber Company, reported that a new synthetic polyisoprene rubber closely resembling tree rubber had been produced. According to Stavely this new product, which Firestone calls Coral Rubber, shows a striking similarity to natural Hevea rubber, as indicated by infrared spectroscopy, X-ray crystalline pattern, unsaturation, carbon-hydrogen ratio, molecular weight distribution, and other factors.

To make this polymer from pure isoprene, lithium metal is used as a catalyst. The catalyst is generally prepared by melting a 35% dispersion in vaseline of lithium metal particles which have a mean diameter of approximately 20μ. The vaseline not only acts as the dispersing agent, but also protects the catalyst, which is highly pyrophoric. The molten mass is then subjected to very high-speed agitation. The entire operation must be carried out in a closed system and under an atmosphere of helium.

According to Stavely, Coral Rubber differs from Hevea rubber in that it has slightly less *cis* 1,4 structure and slightly more 3,4 structure than does natural Hevea rubber; the *trans* 1,4 and 1,2 structure is excluded. This may be the reason why this new product does not absorb oxygen as readily as natural rubber does, has a higher thermal stability, and is more resistant to cracking in tire treads. In contrast to lithium, metals such as sodium, potassium, cesium and rubidium give primarily mixtures of *cis* and *trans* 1,4, 1,2, and 3,4 structures, according to Stavely.

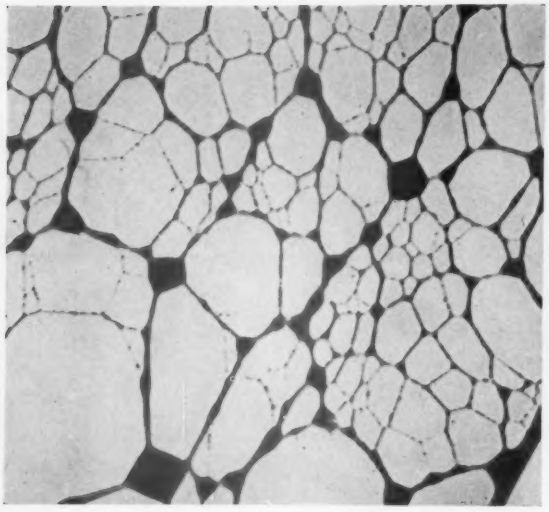

FIG. 1—Electron micrograph of Hevea rubber with fibers and globules. (Original magnification 21,000x).

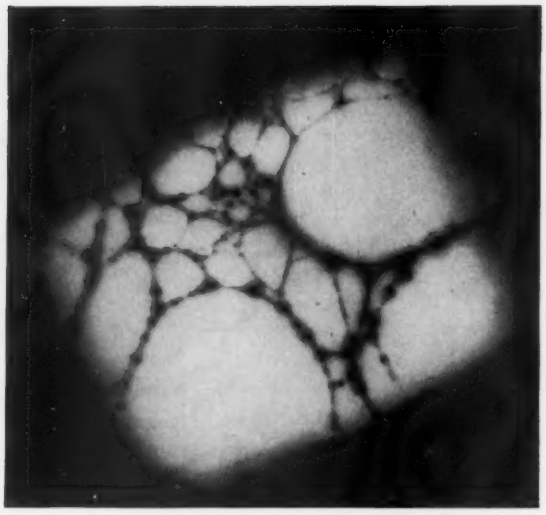

FIG. 2—Ultropak photomicrograph of Hevea rubber with fibers and globules. (Original magnification 600x).

The B. F. Goodrich Company has also made tires from Ameripol SN another synthetic rubber stated to be similar to natural rubber. According to Dr. F. K. Schoenfeld of Goodrich, Ameripol SN corresponds in all its properties to Hevea rubber. Samples of this product are not yet available for morphological studies, however.

Several years ago, Avery A. Morton, Professor of Chemistry at the Massachusetts Institute of Technology, reported on a new catalyst for the polymerization of butadiene or of a butadiene-styrene copolymer. According to Morton *(4)*, the "alfin" catalyst causes the formation of a polymer or copolymer of a very high molecular weight. Morton's disclosures indicate there exists a considerable difference between the molecular weight distribution of alfin-catalyzed polybutadiene and that of the so-called cold rubber polybutadiene, the former being much higher than the latter. Polymerization with the alfin catalyst is very rapid; the high molecular weight polymer exhibits no cross-linking and offers predominantly the 1,4 structure, which also gives a regular X-ray crystalline pattern. It was felt that a study of its morphology might help to show visually that alfin-catalyzed butadiene or its copolymer exhibit a much greater resemblance to natural Hevea rubber than do the standard sodium-catalyzed polymers.

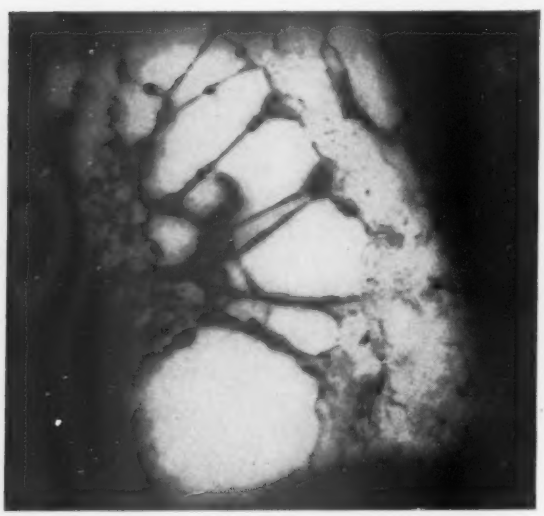

FIG. 3—Ultropak photomicrograph of balata. (Original magnification 600x).

Morphology of the Rubbers

Natural Rubber and Balata: Although the morphology of natural rubber and balata has been discussed previously *(1,2,3)*, it seems advisable to review some of the more important factors involved since they will help to show the similarity of Coral Rubber and to some extent of alfin-catalyzed butadiene-styrene copolymers to natural rubber.

Figure 1 represents an electron micrograph *(1)* of standard Hevea rubber. It clearly demonstrates the existence of a considerable distribution of molecular weight fractions. The low molecular weight fraction, generally known as sol rubber, constitutes the large and intermediate-sized globules, whereas the gel fraction, which corresponds to the high molecular weight, is represented by the fine threads, some of which are interspersed with very small droplets of the low molecular weight fraction. If the same product is examined with the Ultropak microscope *(2, 3)*, the same phenomenon is observed, although the magnification is of course noticeably less (Figure 2). This rubber shows the *cis*-configuration of polyisoprene.

Another naturally-occurring polyisoprene is represented by balata and gutta-percha. Both exhibit a morphology differing strongly from that of natural Hevea rubber, as is evident from Figure 3. These preparations correspond to the *trans*-configuration of polyisoprene. Although there still seems to be an argument among some scientists about whether heating balata or gutta-percha causes the polymer to transform into a *cis*-configuration, proof has been offered from a

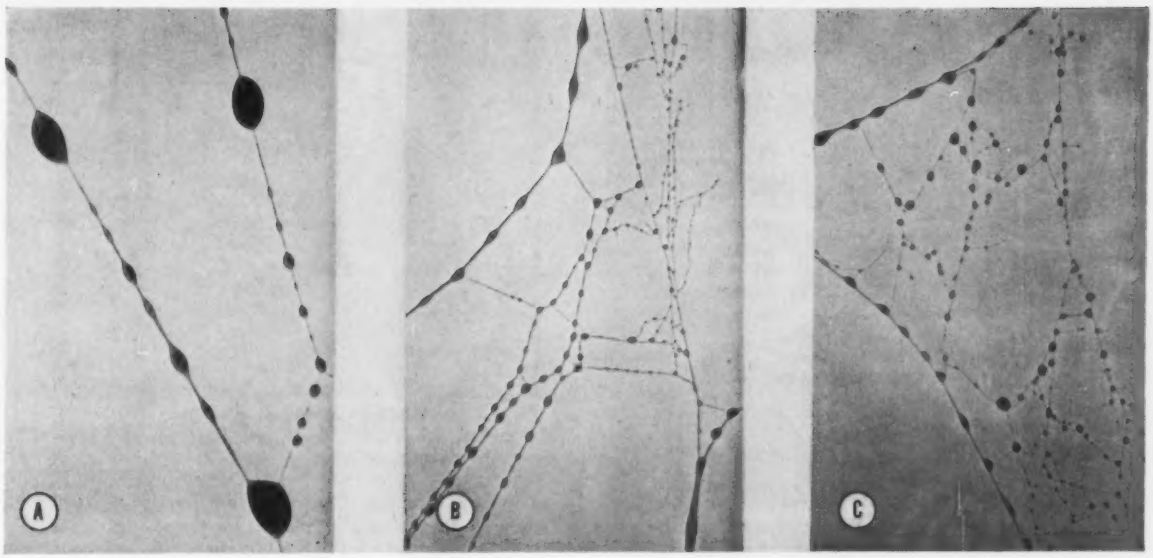

FIG. 4—Electron micrograph of Coral Rubber: (a) Mainly low molecular weight fraction; (b) mainly high molecular weight fraction; (c) complete sample. (Original magnification—8200x).

morphological point of view that this is the case, at least to some extent *(3)*.

Coral Rubber: Coral Rubber, the lithium-catalyzed polyisoprene polymer, exhibits a morphology which is definitely comparable to that of natural Hevea rubber. These morphological studies offer visual proof that we are dealing here with a *cis*-configuration of the polymer, and not with a *trans*-configuration. Figure 4 represents electron micrographs of Coral Rubber, and Figures 5 and 6 show Ultropak photomicrographs of the same material.

A careful study of all these pictures shows that the sol fraction of natural Hevea rubber is more prominent than that found in Coral rubber. It is quite evident, however, that Coral rubber also has a comparatively low molecular weight fraction of polyisoprene. This offers further proof that a certain amount of sol rubber seems to be of importance in the production of truly satisfactory synthetic elastomers.

Since the Firestone Tire and Rubber Company has already carried out most other valuable and important tests with Coral Rubber, it was decided to limit this work to an X-ray study of Coral Rubber in comparison with natural Hevea crepe rubber in the unstretched condition, besides the microscopic studies reported above.

For this work an X-ray spectrometer was used and only unstretched samples which had not previously been subjected to any specific treatment were studied. Figure 7 shows the result obtained with natural Hevea crepe rubber. If we compare this with the result obtained with Coral Rubber, as shown in Figure 8, we immediately notice a pronounced difference, i.e., Hevea

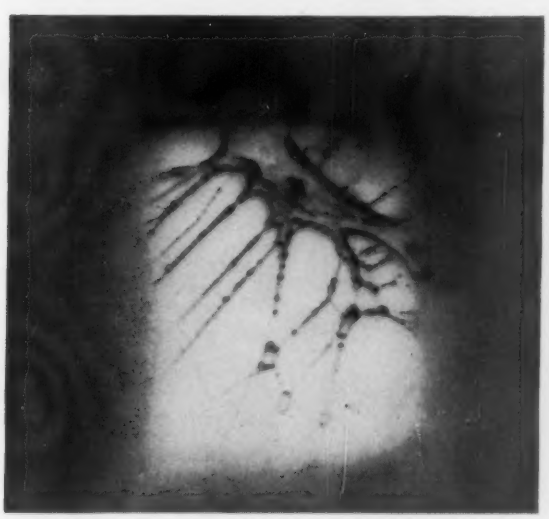

FIG. 5—Ultropak photomicrograph of Coral Rubber. (Original magnification—600x).

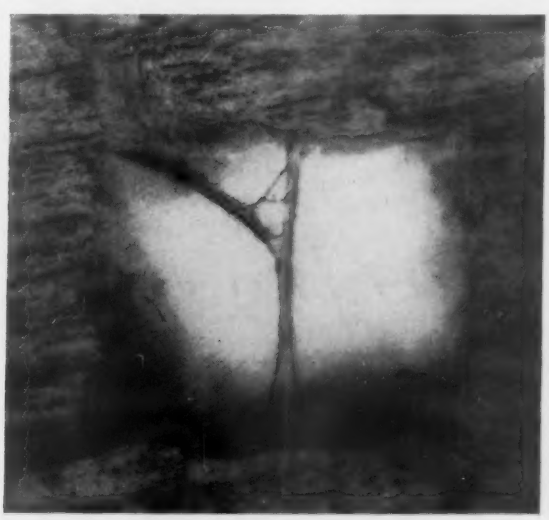

FIG. 6—Ultropak photomicrograph of Coral Rubber. (Original magnification—600x).

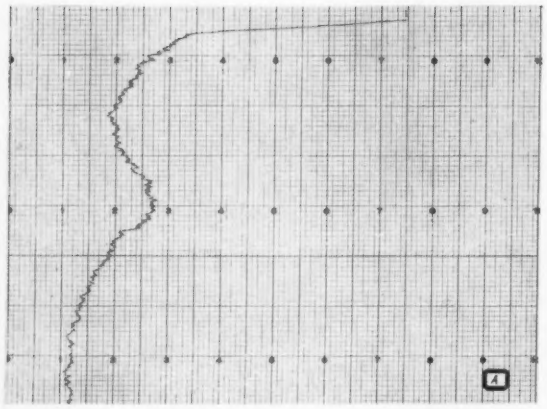

FIG. 7—X-ray spectrograph of natural crepe Hevea.

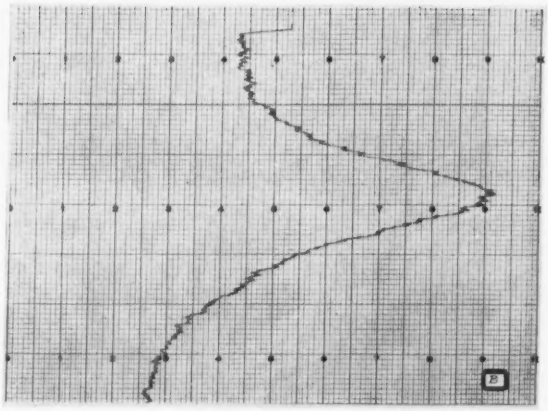

FIG. 8—X-ray spectrograph of Coral Rubber

rubber shows a far less pronounced curve maximum than Coral Rubber does. Both samples are of the same chemical composition and structure, and the question is, what might be the cause of this difference?

Coral Rubber is produced from absolutely pure isoprene which is so polymerized that only the *cis*-configuration is obtained. Natural Hevea rubber also shows this configuration, but crepe rubber still contains resinous material in its structure; in all probability this makes the X-ray pattern pertaining to the isoprene configuration less pronounced.

Further work will be carried out using highly purified crepe rubber in both sol and gel configuration for comparison with the results now reported for Coral Rubber. Coral Rubber of differing molecular weights will also be subjected to the same tests. These results will be reported at a later date.

Alfin-Catalyzed Butadiene-Styrene Copolymer: The morphology of a standard butadiene-styrene copolymer normally shows mostly broad bands, which correspond to the gel fraction. Only occasionally do we obtain results as shown in Figure 9. However, this has been found so far only with the butadiene-styrene copolymer made by what is known as the cold process, which has always resulted in a somewhat more pronounced molecular weight distribution than is the case with the old standard high temperature process.

In contrast thereto, morphological studies of the alfin-catalyzed copolymer clearly reveal the presence of very fine threads interlinked with a few very small globules, indicating the presence of a limited quantity of sol fraction (Figures 10 and 11). The morphology shown in Figure 10 is somewhat in contrast to statements made originally *(4)*, namely, that all the molecular weight is very high. This was not the case, however, with the sample studied; it shows the formation of a broad noncollapsible film, interspersed with extremely fine threads carrying several small globules (low molecular weight fraction). Figure 11 shows only one very fine thread which carries just a few small globules.

In all probability, problems will be encountered in subjecting this product to milling, since it must undergo

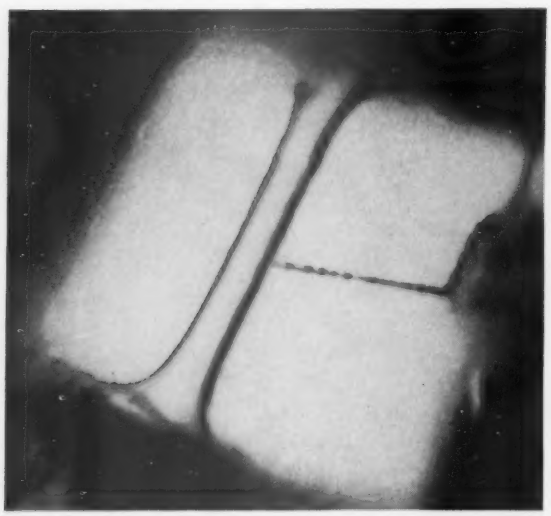

FIG. 9—Ultropak photomicrograph of a standard butadiene-styrene copolymer. (Original magnification —600x). (This sample was made from the first cold-rubber preparation available in the United States).

FIG. 10—Ultropak photomicrograph of alfin-catalyzed butadiene-styrene copolymer. (Original magnification 600x).

a considerable molecular breakdown before compounding ingredients and the like can be incorporated. Nevertheless, the morphological studies have indicated clearly that this new product also deserves far more attention than it has seemingly received so far. It corresponds to natural rubber in its morphology far more than any other butadiene polymer or copolymer has yet done.

Conclusions

The morphology of natural Hevea rubber is discussed and that of balata and gutta-percha is pointed out. On this basis it could be shown that the morphology of the Coral Rubber produced by the Firestone Tire and Rubber Company is more or less identical with that of natural Hevea rubber. This new synthetic elastomer, in unstretched condition, shows a much more pronounced X-ray spectrograph than natural Hevea rubber does when present as crepe rubber. A suggested cause of this difference is offered as a possible explanation.

The morphology of a standard butadiene-styrene copolymer is compared with that of a similar copolymer produced by the use of the alfin catalyst. This product shows a much better molecular weight distribution than does the standard copolymer, as can be seen by morphological studies.

ACKNOWLEDGMENTS

The author wishes to express his thanks to Dr. F. W. Stavely of the Firestone Tire and Rubber Co., Akron, Ohio, for having furnished him with samples of Coral Rubber. Special thanks are also due two colleagues at the Massachusetts Institute of Technology: to Dr. Cecil E. Hall for the electron micrographs of Coral Rubber and to Mr. Albert Mahfuz for the X-ray charts of both natural rubber and Coral Rubber.

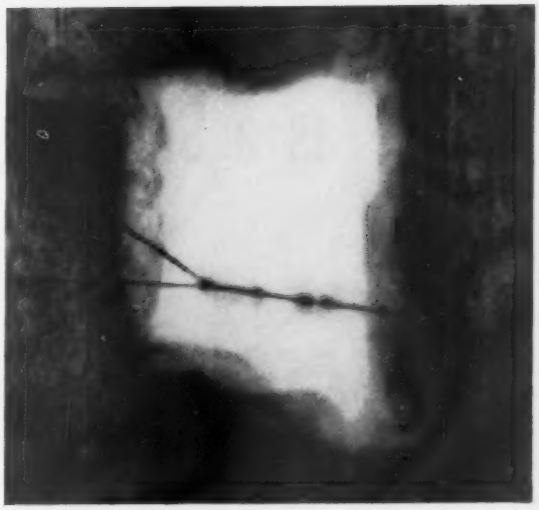

FIG. 11—Ultropak photomicrograph of alfin-catalyzed butadiene-styrene copolymer. (Original magnification 600x)

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Hard Rubber Pumps Aid Television Tube Production

IN THE production of television tubes at the National Video Company, Chicago, Ill., each tube is washed three times in a high-velocity jet of 12% hydrofluoric acid. This acid bath removes oil and other impurities from the inside of the tube prior to applying the screen coating.

To keep up with rapidly expanding production, the company six years ago designed and placed in service the first of many high-speed, automatic tube washing machines. Tubes are placed on a rotating rack which indexes through several washing and rinsing stations. Water and acid jets are synchronized and automatically timed with the rotation of the table.

The jets of hydrofluoric acid are fed directly from hard rubber pumps in the base of each washing section. The pumps turn on and off twice every minute. The acid draining from the neck of the tube is collected in a well and recirculated. This adds to the unusually severe service for the pumps, because the acid solution eventually picks up small abrasive particles which of course circulate through the pump.

On the basis of experience with the first of their specially designed tube washing machines, National Video now has 26 centrifugal pumps of the involute type with molded hard rubber casing and impellers. Hard rubber is highly resistant to strong acids and other chemicals, is dimensionally stable, and has high mechanical strength.

Made by American Hard Rubber Company, these Type WAM pumps have no metal in contact with the acid. The shaft is rubber covered as an integral unit with the impeller, eliminating vulnerable threaded or keyed assemblies. The seal is of a packingless design, consisting of two carbon seal rings in light-pressure, rotating contact. Low blades molded into the back of the 6-inch diameter hard rubber impeller maintain a low fluid pressure at the seal, reducing possibility of leakage, and keeping abrasive particles away from the seal when the pump is running.

Though many of these pumps have operated every 30 seconds, almost 24 hours a day, six days a week, month after month for several years, the company reports excellent service. There have been no failures of casings, impellers or shafts. Main maintenance expense has been replacement of seals—approximate cost: 15c.

Preparation and Use of Cyclized Rubber as a Stiffening Resin in Rubber

By H. J. J. JANSSEN
Rubber-Stichting, Delft, Holland

A new variation of the cyclization of undiluted rubber is described. Experiments in a 5-1 internal mixer have shown that heating rubber with an aromatic sulfonic acid and a very fine white filler (Aerosil) may cause cyclization within 10 minutes at temperatures between 150 and 180°C. Possible applications of this process are discussed.

THE condition for miscibility of low molecular liquids is that the cohesion-energy densities should be of the same order of magnitude. The permissible difference decreases sharply as the molecular weight is increased and a solution of equal amounts of rubber and polystyrene separates into two layers at room temperature when the concentration rises above 2% whereas low molecular aliphatic and aromatic hydrocarbons are completely miscible. The undiluted polymers can, however, be mixed to an apparently homogeneous state on the mill, if the correct mixing temperature is chosen. Presumably the extreme length of the polymer molecules allows them to be caught and dispersed separately in the stress gradient between the rolls.

That the mixture is not stable and tends to separate into the constituents on extension, even after vulcanization of the rubber, can be deduced from the bending of the stress-strain curve towards the strain axis—generally an indication of irreversible changes in structure for many materials. This tendency to irreversible separation, which is a disadvantage for any application, can be suppressed by the formation of primary bonds between the two polymers. There are at present three methods to produce such bonds: (1) Covulcanization (if the added polymer is unsaturated); (2) Mastication in an inert atmosphere; (3) Graft polymerization. If a sufficient number of such bonds have been formed the added polymer can no longer be extracted from the vulcanized compound by solvents and the bend in the stress-strain curve has disappeared.

Note: This is Communication No. 308 of the Rubber-Stichting.

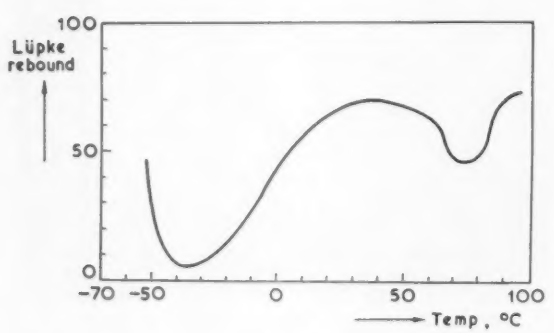

FIG. 1—Rebound temperature curve of a compound with 50 parts of "reinforcing resin" on 100 parts of rubber. To the left, the minimum caused by the rubber; to the right, that caused by the resin.

The relaxation spectrum of combinations of rubber and a second polymer, as shown by the rebound-temperature function, appears to consist of some simple resultant of the properties of the two constituent polymers, for two rebound minima are found at approximately the temperatures characteristic for the rubber and for the added polymer (Figure 1). At temperatures between these two minima the special mechanical behavior of the combination becomes apparent, for then the added polymer will react as an indeformable filler towards fast deformations, while during very slow deformations it may absorb mechanical energy.

If there is a large difference in flexibility of chain segments of the two polymers, the combination should react towards intermediate rates of deformation as a good approximation of a spring and dashpot model (Figure 2), with the rubber molecules as purely elastic springs and the molecules of the added polymer as viscous dashpots without elasticity. If the rubber predominates in the mixture and if the degree of interlinking is sufficiently high, there will be rubber molecules coupled parallel with every viscous molecule and Element III may be neglected. The combination should then possess a high degree of retarded elasticity with low permanent set and should therefore be well suited for those applications for which leatherlike properties are desired. A disadvantage is that, as the added polymer is homogeneously dispersed and bound to the rubber, the crystallization of the rubber is depressed and the tear resistance is low.

A further consequence of the addition of a viscous polymer to rubber and covulcanization is an increase in modulus, for the slow, resin molecules are not able to follow the rate of deformation applied during the modulus determination and therefore a larger part of the strain must be taken up by the mobile rubber molecules; this results in an increase in stress. The increase in modulus obtained with a given amount of resin will thus depend on the mobility of the resin molecules, a property that can be conveniently characterized by the minimum rebound temperature (T_m). A graph of the modulus at 300% extension of vulcanizates with 50 parts of various resins to 100 parts of rubber (Figure 3) against the T_m values of the resins (determined with the Lüpke pendulum) shows that the stiffening action of the resins can indeed be described as a function of the T_m values.

The first "reinforcing resin" for rubber to appear on the market was cyclized rubber prepared in solution. During the last war this product was superseded by the synthetic "high-styrene resins", which have captured a large portion of the sole and heel market. Since the war several attempts to reintroduce cheaper forms of cyclized rubber have again drawn the attention of rubber chemists to the cyclization reaction.

Cyclization of Rubber

The process of modifying rubber by heating with polar agents—known as cyclization—was first described by Harries *(1)*. Subsequent experiments by Fisher *(2)*, Kirchhof *(3)* and others *(4)* showed that, in general, substances that catalyze the Friedel-Crafts type of reaction will also catalyze the cyclization of rubber and among the host of catalysts that have been advocated one finds sulfuric acid, aromatic sulfonic acids, tin and aluminum chlorides, boron trifluoride, etc. In accordance with the modern views concerning the Friedel-Crafts type of reaction, one would expect the double bonds of the rubber to take part in any chemical changes taking place under the conditions used and indeed the reaction products show a decrease in unsaturation as measured by halogen or hydrohalide addition.

The most simple way to explain the physical and chemical changes observed is to assume the formation of rings and this view has been generally accepted, although it has never been proven by the methods of organic structural chemistry *(4, 6)*. If the formation of rings depends on the interaction of the double bonds of neighboring isoprene units a certain number of these bonds—the "lone widows"—will not find a reaction partner. The residual unsaturation of exhaustively cyclized rubbers agrees with the value calculated on statistical grounds by Flory *(5)*. Because of these unevenly distributed, unchanged isoprene units, and probably also because the chains consist of rings of varying structure, cyclized rubber does not crystallize. Cyclized rubber may thus be consistently described as a non-polar, non-crystallizing polymer in which the molecular chains have been stiffened by ring formation.

Cyclized rubber has been prepared since 1930 on the technical scale by heating solutions of rubber with small amounts of soluble catalysts—mainly chlorine compounds of tin. The products are brought on the market as white, transparent powders which are soluble in various solvents.

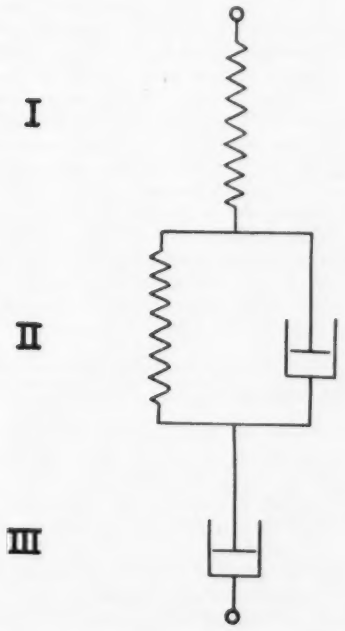

FIG. 2—Spring and dashpot model. (I—Purely elastic: rubber; II—Retarded elastic: rubber and resin; III—Purely viscous: resin).

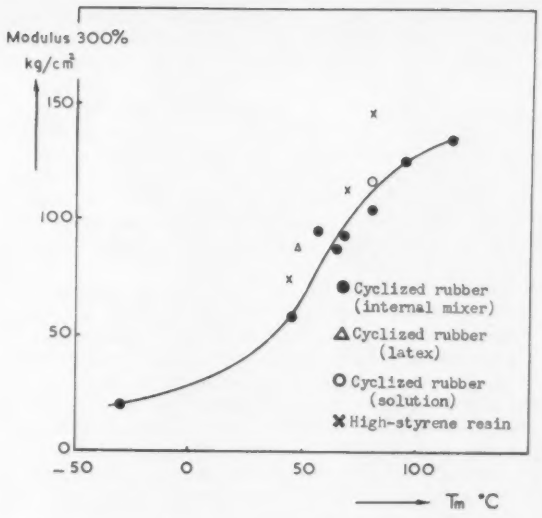

FIG. 3—Modulus versus minimum rebound temperature (for 100 rubber-50 resin pure gum compounds).

In 1947 the Rubber-Stichting *(6)* and the Dunlop Rubber Co. *(7)*, simultaneously but independently, applied for patents on a far cheaper process—the cyclization of the rubber in latex with sulfonic acid. The industrial possibilities of this process are at the moment being evaluated in Malaya on a pilot-plant scale.

There is a third possibility—the cyclization of undiluted rubber. There is evidence that this has been carried out by a number of rubber manufacturers before and during the last war for use in their own products. The process used probably entails mixing a catalyst into rubber on the mill and heating the mixture in an oven for several hours at temperatures around 150°C. At Rubber-Stichting, the cyclization of rubber in the undiluted state was investigated between 1940 and 1943 by Van Royen who found that, on heating a mixture of 100 parts of low protein crepe and 8 parts of toluenesulfonic acid to 150°C. in an oven, a strongly exothermic reaction set in during which the temperature rose to 250°C. Substantial cyclization took place in 30 minutes with the special low protein crepe, but the reaction was about 10 times slower with the normal grades of rubber. Repetition of this work has shown that only inhomogeneous products with medium overall degree of cyclization can be obtained by this process.

New Cyclization Process

Subsequent work at Rubber-Stichting has lead to two improvements in procedure. In the first place, it has been found advantageous to carry out the reaction in an internal mixer in order to ensure rapid, homogeneous mixing and good temperature control, and, secondly, the addition of small amounts of a strongly adsorbing white filler of extremely small particle size (Aerosil) has resulted in a strong accelerating effect on the reaction, which made it possible to obtain complete cyclization of even lower grades of rubber (e.g., D Blankets) in not more than 10 minutes.

At first, the different preparations of toluene-sulfonic acid which were available gave widely different rates of cyclization, and the preparations, which were obtained from chemical supply firms, were either too high in price or too low in activity for economically attractive industrial operation. Then the technical grade of p-toluene-sulfonic acid of Hoechst & Co. was tried and found to be comparable in activity to the best laboratory preparations. Analysis has shown it to be the fairly pure monohydrate. As its price is quoted at f. 2.14 per kg in 1000 kg lots, it would appear that a cyclized rubber prepared using 5 to 10 parts of this acid and 5 to 10 parts of Aerosil per 100 parts of rubber would be able to compete successfully with cyclized rubber made according to the solution or the latex process and, during periods of low natural rubber prices, with high-styrene resins.

The differences in activity between the preparations used may to a large extent be attributed to differences in water content. Drying the Hoechst acid in a vacuum of 1 mm. Hg. at 120°C. gave a decrease in water content from 9.5% (theoretical for the monohydrate) to 3% and produced a strong increase in activity, as shown by experiments on a small mill.

The catalyst is bound to the rubber during the reaction. This could be confirmed by combined sulfur determinations, for roughly 80% of the sulfur in the acid used was found in this manner.

Aerosil also gave a strong accelerating effect on the cyclization in toluene solution. This is shown by the results of four experiments reported in Table I. This indicates that the accelerating effect of Aerosil may be due to heterogeneous catalysis.

Aerosil also increases the rate of reaction for the cyclization process carried out in an oven. Especially the start of the reaction is strongly accelerated and temperatures above 300°C. are easily reached in an oven at 150°C. with all grades of rubber. In view of the side reactions that take place at this temperature and because of the need for bringing all double bonds in contact with the catalyst, it was preferred to carry out the reaction at a lower temperature under efficient mixing.

A large number of cyclization experiments have been carried out in our 5-1 Werner Pfleiderer with the object of finding a reproducible method of operation for the production of cyclized rubber in a time no longer than that required to prepare masterbatches of rubber and high-styrene resin, and in a form which could be used by a rubber manufacturer without giving rise to processing difficulties.

In all experiments, the rubber, the acid and the filler were put into the internal mixer together. This took about one minute. The reaction time was measured from the moment these three ingredients had been added. The starting temperature was 120 to 140°C. As the reaction is strongly exothermic, the temperature rises during cyclization and falls again after the reaction has stopped. These changes in temperature during the process were followed with the aid of a steel mercury thermometer projecting through the heating mantle of the internal mixer close to the inlet. In the normal procedure the highest temperature should be about 180°C.

Further indications of the progress of the cyclization were obtained from the amperometer coupled to the driving motor. During the mixing period the energy uptake should be moderate and constant, otherwise slipping is taking place and the mixing will not be efficient. If appreciable cyclization has taken place and the heat evolved has been removed by the cooling water, the energy required will increase strongly with sharp fluctuations showing that the mixture has stiffened. On the other hand, if the reaction has run out of control, causing the temperature to rise to 200°C., the energy required is not appreciably higher than for the empty internal mixer.

By far the best indication of the progress of the reaction, however, is the amount of gas evolved. About 3 to 4 minutes after filling the apparatus a steady stream of gas should be produced and the flow of steam and cooling water should be regulated so as to keep the rate of gas formation constant. The gas appears to consist mainly of water vapor.

Although this method of working does not give the operator complete control of the process variables, it is possible to produce batches of cyclized rubber of the high degree of cyclization required for use as a "reinforcing resin"—70 to 75%—in a reproducible way. It should be realized that the factors governing the heat transfer in an internal mixer of factory size are quite dissimilar to those encountered on the semi-technical scale and therefore an increase in the scale of production will necessitate renewed experiments to find a reproducible method of production which satisfies industrial requirements.

The experiments have so far given the impression that low protein crepe and C and D Blankets react faster than RSS I Sheet and First Latex Crepe. For the first two grades, 7 parts of acid and 5 parts of Aerosil may suffice. For the other grades, slightly more is necessary, up to 10 parts of acid and 10 parts of Aerosil.

That the reaction mixture is not dangerously corrosive to the lining of the apparatus was shown by the Fe determinations of products and ingredients. The increase in Fe content for a number of batches was found to be 0.009, 0.020, 0.018, 0.019 % Fe per batch.

The cyclization was stopped after about 10 minutes by the addition of 1 part of magnesium oxide (neoprene grade) and the product was dropped from the internal mixer after 1 minute of neutralization.

Table I—Effect of Aerosil on Cyclization in Boiling Toluene

Ingredients				
Dry Crepe Solution (3.2% of rubber) (ml)	p-toluene sulfonic acid (g)	Aerosil (g)	Reaction time (min.)	Degree of cyclization (%)
200	0.50	...	20	5
200	0.50	0.50	20	34
200	0.75	...	30	28
200	0.75	0.75	30	52

Properties of the Products

The color of the products was light to dark brown, depending on the grade of rubber used and on the temperature reached during the reaction. When Blankets were cyclized at 200°C., the product appeared jet black, but even then produced light tan shades in compounds with rubber and fillers.

On cooling, the products hardened to an extent depending on the degree of cyclization reached. Between 0 and 50% of cyclization the product changed from a rubber to a leatherlike polymer, 60 to 70% cyclization gives hard plastic materials, whereas the products with more than 70 cyclization are brittle. The best parameter for these mechanical properties is again the T_m value. Figure 4 shows that the whole range of T_m values of the butadiene-styrene copolymers can be copied with cyclized

rubbers. Figure 5 gives the relation between this temperature and the degree of cyclization determined from the chlorine content of the HCl adduct.

Apart from giving in the temperature of minimum rebound a measure of the average mobility of the polymer, the rebound-temperature curve also indicates the homogeneity of the distribution of the cyclized isoprene units, as a more homogeneous product will show a sharper minimum with higher rebound values at temperatures below and above T_m. The rebound value at high temperatures (100°C.) is an indication of the molecular weight of the product, for if appreciable breakdown has taken place during the reaction the unvulcanized test piece will flow under the impact at high temperatures and the rebound value will be low.

The infrared spectra of the products were identical with the spectra of cyclized rubbers prepared in solution, with the exception of the presence of two bands indicating oxygen-containing groups. There is, of course, every opportunity for oxidation during the reaction. That oxygen is not essential for this method of cyclization follows from the very fast cyclizations obtained in boiling toluene solution (Table I) and from several experiments in the internal mixer carried out in an atmosphere of pure nitrogen, for which no appreciable decrease in rate of reaction could be observed.

As a result of the breakdown during cyclization the products may become completely soluble in benzene after reaction. This solubilization is favored by high temperatures and longer reaction times. The products prepared in nitrogen remained completely insoluble in benzene.

That hot cyclized rubber is very easily miscible with rubber is in accordance with its low polarity. The preparation of 50/50 masterbatches takes 2 to 4 minutes in the 5-1 internal mixer or 5 to 10 minutes on the laboratory mill. If the cyclized rubber has cooled down it should, if it has more than 50% cyclization, be heated before masterbatching.

Cyclized rubbers with T_m between 0 and 20°C. are still rubberlike and have very low gas permeability com-

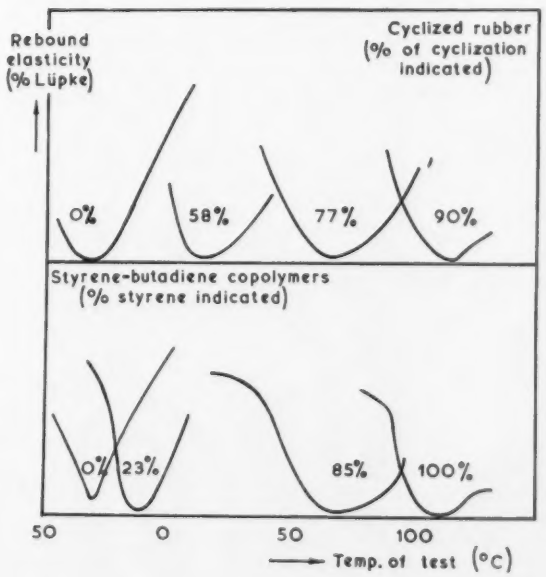

FIG. 4—Rebound elasticity of cyclized rubber (internal mixer) and styrene-butadiene copolymer as a function of temperature.

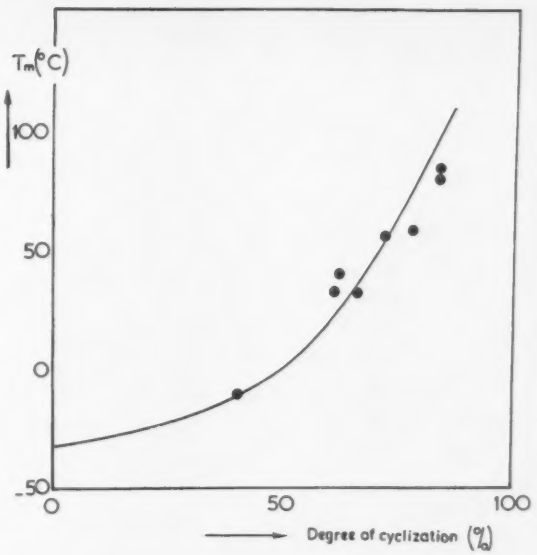

FIG. 5—Temperature of minimum rebound elasticity as a function of the degree of cyclization for cyclized rubber (internal mixer).

parable with that of Butyl rubber. In view of the good adhesion to rubber this offers the possibility of using such products for impermeable layers on rubber. The high brittle point is a disadvantage, however.

Compounds of rubber and cyclized rubber of low degree of cyclization showed greatly improved resistance to ozone cracking in static tests. As this effect may be due to stress relaxation during the test it will be necessary to repeat these experiments using an ozone resistance test with continuously varying stress.

Applications

Solutions: Soluble cyclized rubbers have been used as ingredients in chemically-resistant paints, adhesive cements, printing inks, etc. The possibility of preparing highly concentrated solutions which still have a surprisingly low viscosity appears to be the main advantage of using cyclized rubber here.

Shock-Resistant Plastics: A typical compound would consist of 70 parts of cyclized rubber to 30 parts of rubber as a plasticizer to decrease the brittle point, with the normal amounts of fillers and vulcanizing ingredients. After press vulcanizing in the usual way the article taken out of the mold when hot is indistinguishable from a vulcanized rubber article, but on cooling it changes to a hard, glossy material resembling a plastic, which is very resistant to shocks and blows, although it can be torn or cut fairly easily. The impact resistance is high because the cyclized rubber (with a T_m slightly above room temperature) is strongly damping towards sharp deformations. As these products have the disadvantage of softening around 60°C., the possible range of applications is limited to specialty products, such as shock helmets, golf ball covers, wash basins, etc.

Leather Imitation Goods: This is by far the most promising field and encompasses soles and heels, imitation leather cloth, footballs, etc. A typical compound would consist of 70 parts of rubber with 30 parts of cyclized rubber with white fillers and normal amounts of vulcanizing ingredients.

The main advantage of using resins in these compounds is that high hardness and stiffness can be obtained without seriously decreasing the processability. Compounds with hardness due to fillers only, may show difficulties for press curing of intricate moldings at a hardness above 70° Shore. If the hardness is partly due to resins which soften below curing temperatures, a gain of 10 to 20° Shore may result. The set-up of calendered sheet which is to be vulcanized in hot air or steam is also improved by resin addition. For instance, a leather imitation surface produced by a profiled calender may be retained during such a vulcanization. A third improvement in processability is obtained with microcellular compounds. Here the use of resin may obviate the after-cure in air or steam to reduce shrinkage.

Apart from the low specific gravity, which reduces the weight of the shoe, the retarded elasticity of the rubber-resin combination may be beneficial to foot comfort, for the mechanical energy returned to the floor by highly elastic compounds will be largely unpleasant and tiring.

If the cyclized rubber produced in solution is disregarded as being too high in price for some of these applications, the rubber manufacturer has three stiffening resins to choose from: (1) High-styrene resins; (2) Cyclized rubber masterbatch produced in Malaya from latex; (3) Cyclized rubber produced in his own plant from dry rubber.

It may be of interest to point out a few differences between these three products. Some high-styrene resins have shown difficult mixing with natural rubber. This may result in laminated wear of soling if cheap non-reinforcing fillers are used. It appears that the two not completely compatible polymers are rolled out into layers on the mill, and when used for thick soles these layers may separate, causing extremely rapid wear. Otherwise the properties of these resins are excellent, although balanced by a fairly high price.

The cyclized rubber prepared in latex is usually mixed with latex before precipitation. The product—a masterbatch—therefore consists of hard, insoluble globules imbedded in a rubber matrix. As it is not to be expected that these globules will be dissolved homogeneously during the ordinary compounding techniques, the cyclized rubber will act as a filler which has good adhesion to rubber, but is too coarse to give an increase in tear resistance.

The cyclized rubber prepared in an internal mixer is completely compatible with rubber and mixing is very fast. Both cyclized rubbers will be able to compete with the synthetic resins during periods of low natural rubber prices.

ACKNOWLEDGMENT

This work was part of a project on "soling compounds" of the Research Department of the Rubber-Stichting, which was under the management of Dr. H. C. J. de Decker. The author thanks Dr. de Decker and Dr. G. J. van Amerongen for valuable discussions.

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Report on Avoidable Accidents in the Rubber Industry

DESPITE its continually improving record for safety, many avoidable accidents still occur in the rubber manufacturing industry. Some are due to carelessness, some to lack of suitable training programs, some for a multitude of other reasons. The following reports are taken from a recent issue of the *Safety Newsletter* issued by the Rubber Section of the National Safety Council.

Mill Rolls: An employee had just put cold rubber in the mill and was reaching under the mill in an attempt to start his band. His left hand became entangled with the rubber on the underneath side of the mill. His left arm was wedged between the front roll and the bar which holds the ribbon knife holder. The force of the revolving mill roll caused the employee's left arm to lift this bar out of its socket and in the process, his arm was cut by the edge of the knife holder. Fortunately, the knives themselves had not yet been installed in the holder. The knife holder has since been moved back to increase the clearance from 4½ to 7½ inches.

Storage areas: A receiving department employee was caught between a fork-lift truck and a wall in a fabric storage area at an elevator. One employee passed behind the fork-lift truck which was storing fabric. As the operator backed away from the rack, he caught the employee between the brick wall and the truck. Injuries included a fractured pelvis.

Rag Refining Mill: An employee lost his index finger when he attempted to pick up a roll of stock which had fallen off an inclined take-off belt from a rag refining mill. The stock landed on a gear box at the base of the conveyor. The gear box cover was loose and the stock in hitting the cover caused it to open. The operator, in attempting to pick up the stock, dug his hands into the material and his index finger went into the exposed gears. In checking the drive gear, it was found that the cover or guard was held normally by two bolts. At the time of the investigation one bolt was missing, which permitted the guard to swing back, thus exposing the gears. Why the bolt was missing is not known. A welded guard with an opening large enough for an oil can spout has now been installed over the gears.

Laboratory Mill: A worker was wiping moisture from a lab mill with a cloth while the mill was in operation. The cloth caught between the rolls pulling his right hand in. It caught the third finger resulting in fracture of the third finger. He jerked his hand free before tripping the safety. The mill was equipped with both hand and knee safeties. (According to a recent Goodyear publication, in some instances knee-type safeties have proven unsatisfactory on laboratory mills because they were placed too low for tall men to strike them with their knees. It is worthwhile to examine all such safeties to see whether they will perform effectively regardless of the height of the worker.)

Rotational Molding of Hollow Goods

By T. A. MILLER

President, Akron Presform Mold Co., Cuyahoga Falls, Ohio

THE increasing acceptance and use of rotational molding of vinyl plastisols by plastic manufacturers is expected to spread soon into use by companies in the rubber field who are looking for new and profitable products. There are numerous reasons for the trend toward more extensive use of this process. For producing hollow articles it has the following advantages:

(1) Plastisols produce a better looking product finish than rubber, through high gloss and unlimited color possibilities in a wide range of hardness, and make in one piece many articles which by other methods have to be made in several pieces and then cemented or cured together. In addition, plastisol products are nearly impervious to the passage of air, as contrasted to the diffusion of pressure through rubber in a relatively short period of time.

(2) More accurate weight control can be achieved by dispensing precise quantities of materials into each mold cavity.

(3) Less floor space is required than for many casting methods. A complete unit requires only 14x16 feet.

(4) Lower labor costs are achieved since these machines perform so many operations automatically.

(5) Low scrap and reject rates are obtained.

(6) Equipment and mold costs are much less than that required for rubber molding; in many cases only one-tenth the cost.

(7) Thickness and weight of products can be changed as desired without changing molds.

(8) Several different products and several different colors can be molded simultaneously on one machine.

(9) Molds can be changed without stopping the machine and without loss of production.

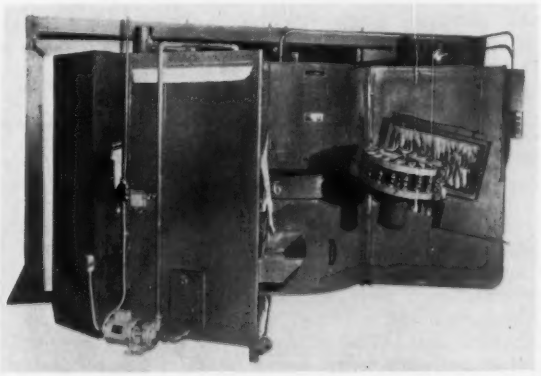

FIG. 1—Complete view of rotational molding machine showing a spindle with multiple cavity mold about to enter the circular oven.

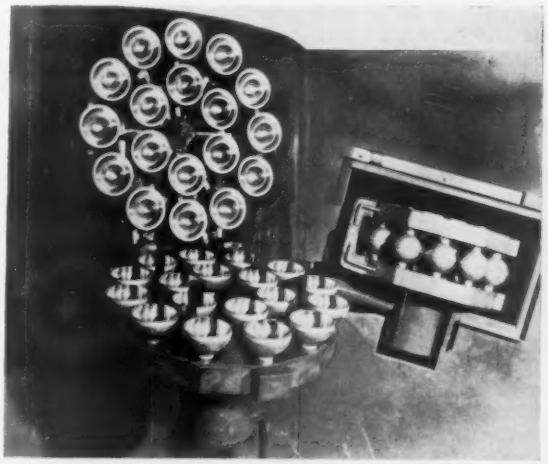

FIG. 2—Open view of 18-cavity mold used for producing four-inch diameter balls. It is hinged for easy opening, filling and removal of products.

Operation of System

The larger and more efficient types of rotational molding machines (Figure 1) consist of six spindles which revolve about a central shaft. Each spindle carries a multiple cavity mold (Figure 2) and has its own rotational movement independent of the central shaft movement. This four-way operation assures uniform thickness and complete forming of the article being produced.

The entire unit is enclosed in a circular oven and cooling unit occupying about two-thirds of the complete circle. The remaining one-third is open to allow the operator to strip the molds and refill them for the next cycle. A complete cycle takes from 12 to 20 minutes, and with a machine carrying six spindles this means a multiple cavity mold is stripped every two to three minutes. A machine of this sort can produce as many as 1620 articles per hour. This very high production rate can be handled by one operator at an obviously low labor cost per article.

The plastisol is carefully metered into each multiple cavity mold (Figure 3) to provide a uniform thickness and weight to each article. The top half of the mold is closed on the bottom half and secured by using a powered torque wrench. These steps are accomplished while the central shaft is moving. The mold then moves through a curtained opening into the oven and starts its own rotation. The rotation continues all the time it is in the oven and stops automatically as it comes out. The temperature is maintained high enough to produce a range of 350°F. within the mold cavities. At this temperature the plastisol goes through the progressive

stages of gelling and fusing into its final resilient form.

As the mold emerges from the oven, it passes through a controlled shower and into the unloading and loading area. The operator then opens the mold and removes the completed articles, after which the mold is ready for filling and another complete cycle.

Type of Molds

Aluminum or copper are usually used in making molds because they are easy to work with and absorb heat quickly. Iron or steel should not be used since it causes decomposition of some plastisols and is slow to heat. Usually, several cavities are joined together in a circular type multiple cavity mold. This arrangement and number of cavities is determined by the capacity desired.

Direct machining of aluminum stock is the least expensive method of mold making when a small number are required and where the shape of the article is not too complex. Pressure cast aluminum cavities are used where a large number are required and where the die cost can be justified.

Special problems arising over intricate shapes, wall thickness, etc., must be met as they arise and help should be sought from the machine and mold manufacturer who has had years of experience with these matters.

Operational Problems

Moisture in the molds will cause blisters, and much care is required to see that each cavity is completely blown dry before metering in the plastisol. The same care must be taken to keep air bubbles from getting trapped in the plastisol compounds. Molds require a breaking-in period after which stripping becomes easier. Parting agents should not be used if the article is to be painted. Controlling the oven temperature is important, because over-heating causes decomposition and under-heating leaves the article deficient in tensile strength.

Uniformity of thickness and its relation to the rotating of the mold is too complex to be covered briefly, but it is very important that it be thoroughly understood and properly adjusted to achieve good results.

FIG. 3—Unit used for dispensing premeasured amount of plastisols into mold cavities.

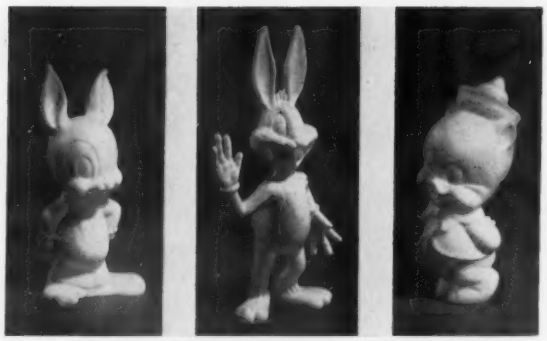

FIG. 4—Many shapes and sizes, as indicated by the animals in the photo above, can be produced by this process.

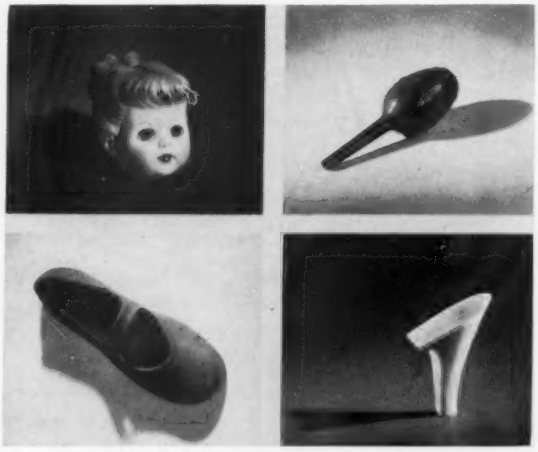

FIG. 5—Such items as doll heads, syringes and bath shoes show the wide variety of products possible with rotational molding.

More and more plastic and rubber manufacturers are turning to automatic rotational casting machines for making hollow plastisol articles. Figures 4 and 5 show some of the articles currently being produced. This trend is largely due to the high profit prospects resulting from the faster output and lower labor costs of this process. Rotational molding may well mark the beginning of a new era of profits and production in the hollow goods field.

Lawrence Midget Pump

Lawrence Pumps, Inc., 371 Market St., Lawrence, Mass., has announced a new line of midget pumps for the chemical and process industries. All bearings are prelubricated and "sealed-for-lift." Packing boxes are eliminated and replaced with externally adjusted mechanical seals. The pumps are of specially rugged construction with extra heavy shaft, bearings and non-clogging impeller. All wetted parts are made of L-20 stainless steel which is particularly resistant to corrosive solutions. Three models are available. Capacities range from five to 40 GPM and heads from 25 to 160 feet.

A New Method for Determining the Dynamic Mechanical Properties of Rubber

By R. E. MORRIS, R. R. JAMES and C. W. GUYTON

Rubber Laboratory, Mare Island Naval Shipyard, Vallejo, Calif.

IN submarines, machinery with reciprocating rotating parts is placed on rubber mountings to isolate noise and vibration from the hull of the vessel. Otherwise the hull would radiate the noise to the sea and facilitate detection of the submarine by the enemy. The dynamic mechanical properties of the rubber in the mountings determine to a large extent their effectiveness in isolating noise and vibration *(2)*.

Only within the last ten years has reliable information become available on the dynamic mechanical properties of rubber at high frequencies of vibration. Most of this advance has been due to Nolle *(8, 9)*. Other workers in this field have been Witte, Mrowca and Guth *(10)*, Hillier *(3)*, Cramer and Silver *(1)* and Morris, James and Snyder *(7)*.

Nolle *(8)* gave an excellent description and analysis of techniques for measuring the dynamic mechanical properties of rubber over the frequency range of 0.1 to 120,000 cycles per second (cps). The methods which he described were identified as rocking-beam oscillator, vibrating reed, strip transmission, strip resonance and magnetostriction. Guth and associates, Hillier, and Cramer and Silver used the strip transmission method in their respective investigations. Morris, James and Snyder used a bar transmission method which had not been previously described.

This paper deals with a modification of the bar transmission method whereby the resonant frequency and dispersion of the vibrational energy above and below the resonant frequency are measured. From this information the velocity of sound, Young's modulus and loss factor of the rubber are calculated.

Theory

When a metal bar is clamped at both ends by exceedingly rigid and heavy clamps, and longitudinal vibrations are produced in the bar by suitable means, a longitudinal standing wave will occur in the bar at a certain frequency. This standing wave is ½ wavelength, and has an amplitude node at each end of the bar and an amplitude antinode at the center. The longitudinal velocity of sound in the bar can be calculated from the length of the bar and the frequency of resonance:

$$C_o = 2LV_o \qquad (1)$$

where C_o = velocity of sound in centimeters,
L = length of bar in centimeters, and
V_o = frequency in cycles per second at resonance.

The Young's modulus of the bar can be calculated from the velocity of sound in the bar and its density:

$$E_1 = pC_o^2 \qquad (2)$$

where E_1 = Young's modulus in dynes per square centimeter, and
p = density of metal in bar.

If the bar is rubber instead of metal, the phenomenon of resonance is more complicated because rubber absorbs more vibrational energy than metal. This behavior of rubber is due to its higher internal viscosity. The effective modulus is no longer the modulus calculated from equation (2), but is a value which takes into account the force necessary to overcome the viscous component in the rubber as well as the force necessary to overcome the elastic component. Nolle termed this modulus the complex Young's modulus. He gave the following relationship (using complex numbers) between the complex modulus, the real modulus representing the elastic component and the so-called imaginary modulus representing the viscous component:

$$E^* = E_1 - iE_2 \qquad (3)$$

where E^* = Complex Young's modulus,
E_1 = Real or ordinary Young's modulus, and
E_2 = Imaginary Young's modulus.

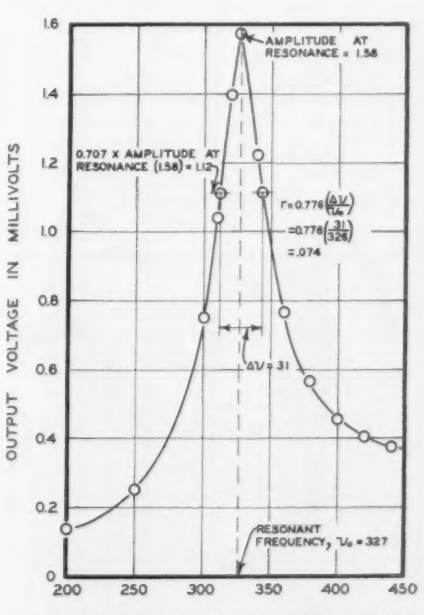

FIG. 1—Resonant peak for natural rubber gum specimen showing method of finding the band width, ΔV.

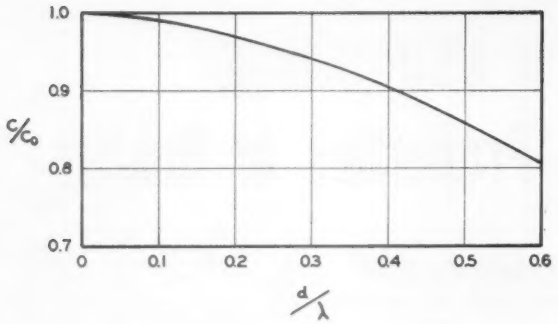

FIG. 2—Ratio of longitudinal wave velocity in a cylinder to the Young's modulus velocity as a function of diameter to wavelength ratio d/λ.

The real and imaginary moduli were calculated from the following equations:

$$E_1 = \frac{pC_0^2(1-r^2)}{(1+r^2)^2} \qquad (4)$$

$$E_2 = \frac{2rE_1}{1-r^2} \qquad (5)$$

where $r = 0.776\frac{\Delta V}{V_0}$, and

ΔV = band width in cycles per second measured between the two frequencies for which the amplitude of vibration was $1/\sqrt{2}$ times the amplitude at V_0. (See Figure 1.)

Nolle stressed the importance of the ratio E_2/E_1, which he termed the loss factor. He pointed out that the loss factor is a means of classifying rubbers according to their potentialities as practical absorbers of mechanical energy. The loss factor is a measure of the damping of an oscillating system composed of a rubber sample attached to a rigid surface at one end and to a freely oscillating mass at the other end, such as a machine supported on rubber mountings. The damping of such a system is related to the loss factor of the rubber in the mounting by the following equation:

$$\log_e \frac{y_0}{y_1} = \frac{E_2}{E_1}$$

where y_0 = amplitude of one cycle of free vibration, and
y_1 = amplitude of following cycle of free vibration.

Harrison, Sykes and Martin *(2)* pointed out that the sound velocity calculated from equation (1) is not exact if the diameter of the cylindrical test specimen is an appreciable fraction of the longitudinal wavelength in the specimen. In this case the sound velocity, C, is less than the sound velocity, C_0, which would be calculated from equation (2).

Figure 2 is a reproduction of a portion of the curve given by these authors for obtaining the ratio of C to C_0 from the ratio of the specimen diameter, d, to the wave length, λ. In the present work the uncorrected velocity was calculated from equation (1) using the measured values of specimen length ($\frac{1}{2}\lambda$), and the corrected velocity obtained from the ratio given in Figure 2 was used in equation (4) to calculate the real modulus.

Description of Apparatus

The test apparatus consisted of two parts: the specimen holder and the associated electronic equipment. The specimen holder comprised a very heavy, rectangular, solid steel frame with two, cylindrical piezoelectric transducers mounted face to face on the inside of the frame. One of the transducers was threaded into the center of the lower cross piece of the frame. The other was

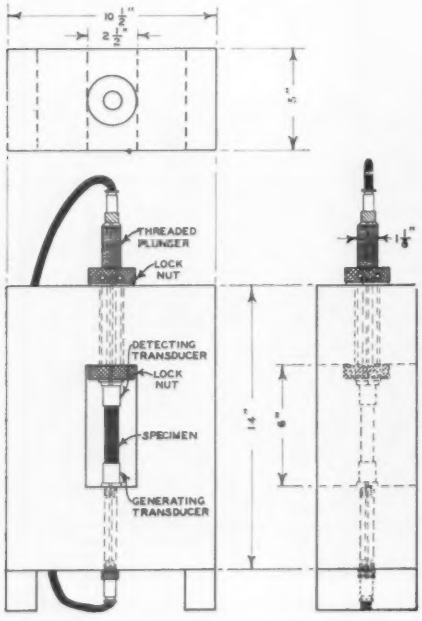

FIG. 3—Drawing of specimen holder.

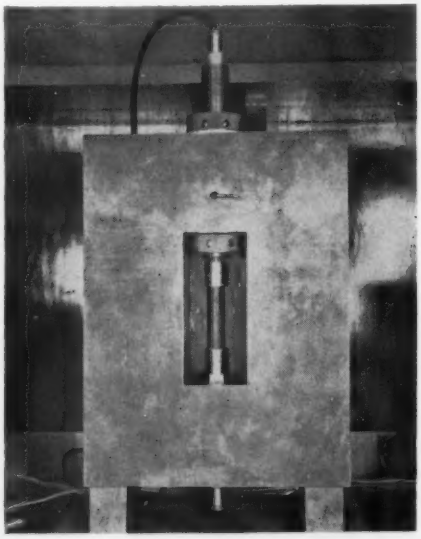

FIG. 4—The specimen holder, shown above, is isolated from outside vibrations by mounting it on a one-inch thick slab of felt.

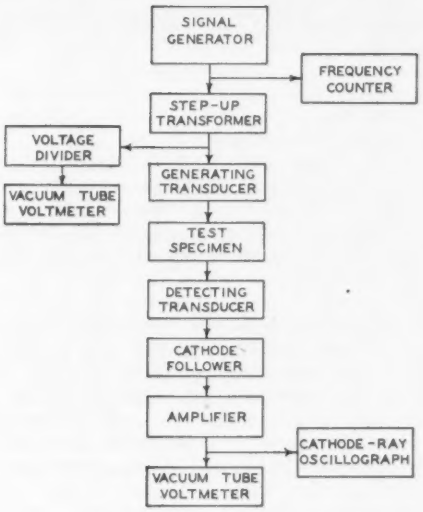

FIG. 5—Schematic diagram of test apparatus.

threaded into the end of a plunger which passed through the center of the upper cross piece. The plunger itself was threaded and provided with two locknuts for rigidly positioning the upper transducer.

The frame was supported by two legs to provide clearance for the cable going through the lower cross piece into the lower transducer. The cable to the upper transducer was admitted through the hollow plunger. The specimen holder was isolated from outside vibrations by mounting it on a one-inch thick slab of felt. The specimen holder with specimen in position is illustrated by a drawing in Figure 3 and the reproduced photograph in Figure 4.

The transducers in the specimen holder were actually accelerometers made by the Massa Laboratories, Inc., Hingham, Mass. *(4)*. Each consisted of a sandwich of six ammonium dihydrogen phosphate (ADP) crystal plates mounted within a stainless steel housing one inch in diameter and about one inch long. The housing was closed with a metal cap which had on its outer face a concentric cavity 13/16-inch in diameter and 3/64-inch deep. The cap was about 0.010-inch thick at the bottom of the cavity and was cemented to the end of the crystal assembly. The other end of the crystal assembly was cemented to the base of the accelerometer.

When testing, a cylindrical rubber specimen ¾-inch in diameter was clamped between the two transducers. The generating (lower) transducer was caused to vibrate in a vertical direction by applying alternating current at 500 volts to the crystals. This impressed a longitudinal vibration on the rubber specimens. The amplitude of vibration at this voltage was approximately 5×10^{-6} inches according to Massa *(5)*. The alternating current was obtained from an audio signal generator through a step-up transformer. The voltage was monitored with a vacuum tube voltmeter, and the exact frequency of alternations was read from a frequency counter.

The voltage produced in the detecting (upper) transducer by the longitudinal vibrations in the rubber specimen was passed through a cathode follower, amplified, and measured with a vacuum tube voltmeter. The wave forms of the generated and detected signals were observed with an oscilloscope. A block diagram of the

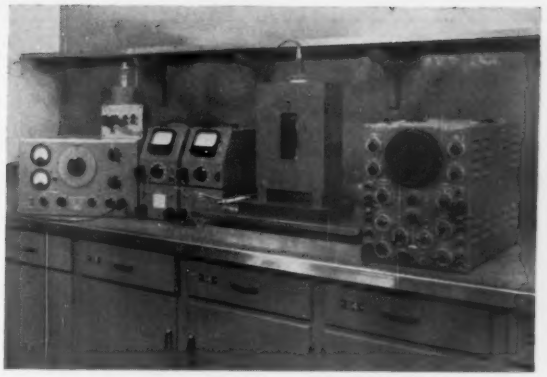

FIG. 6—Test apparatus (frequency counter not shown).

entire system is shown in Figure 5, and a photograph of the apparatus excepting the frequency counter is shown in Figure 6.

Details of Operation

The reason for the very heavy construction of the specimen holder frame was to limit the resonances in the frame to high frequencies. These resonances would otherwise have interfered with the determination of the resonant frequencies of the rubber specimens. Figure 7 is a plot of the voltage from the detecting transducer when the generating transducer was driven with 500 volts at various frequencies with no rubber specimen between the transducers. It will be noted that the first resonance in the specimen holder occurred at 3280 cps, and that the disturbance due to this resonance would not interfere with the determinations of resonances in rubber specimens at frequencies below 3000 cps. This was to be expected.

It was intended that a rubber specimen being tested would resonate at ½ wavelength with the amplitude nodes at the ends of the specimen. In order for this to take place, it was required that the ends of the specimen bear against exceedingly rigid surfaces to reflect the sound wave. The ADP crystals in the transducers had a Young's modulus of about 10×10^{10} dynes per square cm. This was sufficiently greater than the

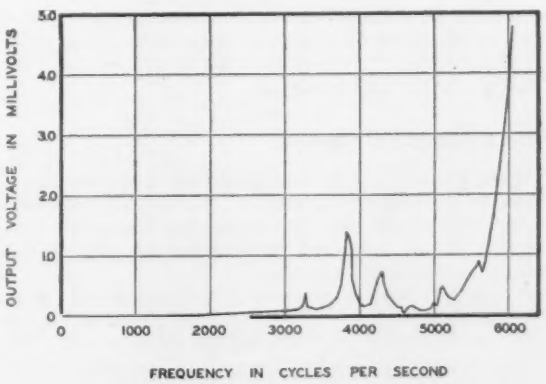

FIG. 7—Voltages at detecting transducer when rubber specimen was not clamped between transducers.

TABLE I—EXPERIMENTAL DATA FOR NATURAL RUBBER SPECIMEN, P = 0.978, L = 7.05 CM, TESTED AT VARIOUS COMPRESSIONS

Comp. (%)	Ampl. at Resonance (mv)	λ (cm)	V_o (cps)	ΔV (cps)	C_o (corr.) (cm/sec.)	E_1 (dynes/cm²)	$\frac{E_2}{E_1}$
1.8	1.58	13.85	327	31	4620	20.6×10^6	0.15
6.4	1.53	13.21	346	34	4660	20.9×10^6	0.15
10.0	1.48	12.70	359	36	4650	20.8×10^6	0.16
13.6	1.37	12.19	385	37	4790	22.1×10^6	0.15
17.2	1.32	11.68	405	42	4830	22.5×10^6	0.16

Young's modulus of rubber, which ranges between 10×10^6 and 1000×10^6 dynes per square cm., for the transducers to serve as efficient reflectors.

It was proven that the rubber specimen being tested resonated at ½ wavelength with the amplitude nodes at the ends of the specimen. A natural rubber gum specimen, nominally 2-¾ inches long, was placed between the transducers and compressed 2%. The generating transducer was driven at 500 volts, and the alternating frequency of the current was gradually increased until resonance occurred in the rubber specimen as indicated by a peak in the signal from the detecting transducer. While resonance was maintained, the longitudinal movement of the surface of the specimen at various points along its length was surveyed with a phonograph pickup. The signal from the pickup was observed on an oscilloscope. The signal had a maximum value when the needle of the pickup was pressed lightly against the rubber specimen midway between the transducers. The signal decreased when the needle was moved toward either transducer and reached a minimum value next to the transducers.

This testing method employed measurements of specimen length, resonant frequency and band width to determine the dynamic mechanical properties of rubbers. Since the resonant frequency of a rubber specimen was directly related to its length, specimens of different lengths were needed to determine dynamic properties at different frequencies. The length of the specimens, however, could not be varied over a very wide range because the inside dimensions of the frame limited the maximum specimen length to 2.75 inches, and the undesirability of a standing wave in the transverse direction limited the minimum specimen length to 0.75 inch. In view of these limitations on specimen length, the frequencies at which the dynamic properties of any given vulcanizate could be determined, could not be varied by a factor greater than about 3.7.

Effects of Various Test Conditions

When establishing the test procedure it was necessary to decide upon certain conditions, namely, the treatment of the ends of the test specimens, the degree of compression during test, and the duration of compression before starting measurements.

It was felt that the resonant frequency would not be affected significantly by the degree of bearing friction between the rubber specimen and the transducers. This followed from the fact that the ends of the rubber specimen were nodes when resonance occurred, and therefore were essentially stationary. Bearing friction was proven to have no effect on resonant frequency by a series of measurements using the same rubber specimens and different degrees of friction between the specimens and the transducers.

The same resonant frequencies, within experimental error, were obtained when measurements were made with discs of fine-grit sandpaper between the specimen and the transducers (rough surface against rubber), with clean and dry surfaces, with surfaces lubricated with silicone grease, and with the surfaces lubricated with silicone oil. It was decided to use silicone grease in subsequent measurements to guarantee good contact between the ends of the rubber specimens and the transducers.

To find the effect of compressing the rubber specimen on its dynamic properties, a natural rubber gum specimen approximately 2.75 inches long was tested at various compressions ranging from 1.8% to 17.2%. The ambient temperature was held at 74°F. The results of the tests are given in Table I. As the compression of the specimen increased, its amplitude of vibration (voltage at detecting transducer) at resonance decreased. Up to 10% compression there was little if any effect on sound velocity, real modulus or loss factor. From 10% to 17.2% compression, sound velocity and real modulus increased somewhat. It was decided to standardize on 2% compression for future measurements at room temperature unless the effect of compression itself was being investigated.

The effect of elapsed time between compressing the specimen and testing was determined using natural rubber and Thiokol FA gum specimens, approximately 1.75 inches long and held at 2% and 6% compression. It was found that the measured properties, sound velocity and band width, were unchanged within experimental error when the compression time was extended from 15 minutes to one hour. A compression time of at least 15 minutes before the measurements was adopted for subsequent tests.

Precision of Test Results

The precision or reproducibility of the results of this test was found by performing tests on the same natural rubber gum specimen at random intervals over a period of four months. A total of 14 tests was made. The specimen was approximately 2.75 inches long, was compressed 2%, and was subjected to an ambient temperature of 73.5° ± 1°F. during the tests. The statistical information obtained for the two measured values, resonant frequency and band width, is given below.

	Resonant Frequency V_o	Band Width ΔV
Highest value, cps.	338	32
Lowest value, cps.	324	28
Average value, cps.	330	30
Average deviation, cps.	2.9	0.9
Maximum deviation, cps.	8.0	2.0
Standard deviation, cps.	3.7	1.2
Coefficient of variation, %	1.1	4.0

The foregoing data show that the test results had excellent precision.

Some Experimental Results

Tests over Range of Frequencies: Figure 8 illustrates the signals received by the detecting transducer when specimens approximately 2.75 inches long and compressed 2% were tested over the range of frequencies of 0 to 1400 cps. The signals received through a natural rubber gum specimen and a Butyl gum specimen are shown. The natural rubber specimen exhibited

a very sharp resonance at 327 cps and progressively less sharp resonances at 638 and 903 cps. These peaks corresponded to standing waves of ½, 1 and 1½ wavelengths, respectively. The frequency of the standing wave containing a full wave length was not exactly twice that of the first standing wave, as would be the case in a metal bar, because the velocity of sound in the rubber increased with frequency.

The Butyl rubber specimen had a very flat resonance at about 900 cps. This characteristic was due to the very high internal viscosity of Butyl rubber. Accurate calculations of dynamic properties could not be made from this curve.

Tests of Various Gum Vulcanizates: Test specimens were prepared from the eight gum stocks formulated in Table II. Test specimens of each stock were prepared with the following approximate lengths: 0.75, 1.25, 1.75, 2.25 and 2.75 inches. The dynamic mechanical properties of these specimens at 2% compression and an ambient temperature of 73.5° ± 1°F. are given in Table III.

Analysis of the data in Table III showed that over the attainable frequency span for each stock, the following relationships prevailed:

(1) Sound velocity, real modulus and loss factor tended to increase with frequency for all of the stocks.

(2) Natural rubber had the lowest sound velocity, lowest real modulus and lowest loss factor of any of the rubber tested. The only exception to the foregoing was the slightly lower loss factor of GR-S 1023 around 1000 cps.

(3) GR-S 1015 had the lowest sound velocity and the lowest real modulus of the four GR-S polymers tested, but GR-S 1023 had the lowest loss factor.

(4) Thiokol ST had somewhat lower sound velocity and somewhat higher real modulus than GR-S 1015, but considerably higher loss factor.

(5) Hycar 1014 and Neoprene GRT had high sound velocities, high real moduli and high loss factors.

Tests of Loaded Stocks: Specimens approximately 2.75 inches long were prepared from natural rubber stocks loaded respectively with 10, 20 and 30 volumes of

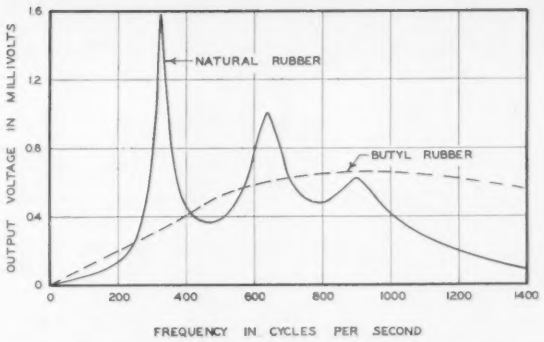

FIG. 8—Resonances in 2.75-inch specimens of natural rubber and Butyl rubber gum stocks.

the following materials per 100 volumes of rubber: Circo light process oil, Thermax medium thermal black, Shawinigan acetylene black, Micronex medium processing channel black, Philblack E super abrasion furnace black. The basic recipe for these stocks was the same as the pure gum recipe given in Table II. The results of tests on these specimens are given in Table IV.

Adding 10 volumes of oil to the natural rubber stock brought about reductions in sound velocity, real modulus and loss factor. Further additions of oil caused greater reductions in sound velocity and real modulus, but the loss factor rose to a value about equal to that of the gum stock.

The addition of the carbon blacks resulted in increases in sound velocity, real modulus and loss factor. Medium thermal black caused less change in these properties than the other blacks. Acetylene black and channel black produced about the same changes in sound velocity and real modulus. The loss factors of vulcanizates containing the latter three blacks were about the same (0.22 to 0.26) at all black loadings. This latter finding indicated that these carbon blacks caused the imaginary modulus to increase at the same rate as the real

TABLE II—RECIPES FOR GUM STOCKS

	Natural Rubber	GR-S 1000	GR-S 1015	GR-S 1023	GR-S 1500	Thiokol ST	Hycar 1014	Neoprene GRT
Smoked sheet	100.0	—	—	—	—	—	—	—
GR-S 1000	—	100.0	—	—	—	—	—	—
GR-S 1015	—	—	100.0	—	—	—	—	—
GR-S 1023	—	—	—	100.0	—	—	—	—
GR-S 1500	—	—	—	—	100.0	—	—	—
Thiokol ST	—	—	—	—	—	100.0	—	—
Hycar 1014	—	—	—	—	—	—	100.0	—
Neoprene GRT	—	—	—	—	—	—	—	100.0
Pelletex	2.0	—	—	—	—	—	—	—
Protox 166	5.0	5.0	5.0	5.0	5.0	0.5	5.0	5.0
XLC Magnesia	—	—	—	—	—	—	—	7.0
Stearic acid	1.0	1.0	1.0	1.0	1.0	3.0	1.0	1.0
Califlux 510	3.0	—	—	—	—	—	—	—
Neozone D	1.0	—	—	—	—	—	—	—
Antioxidant 2246	1.0	—	—	—	—	—	—	—
Altax	1.0	—	—	—	—	—	—	—
Thionex	0.3	0.3	0.3	0.3	0.3	—	—	—
Methyl Tuads	—	—	—	—	—	—	1.4	—
Sulfur	1.5	1.8	1.8	1.8	1.8	—	0.8	—
GMF	—	—	—	—	—	1.5	—	—
Vulcanization: min./°F.	65/290	65/290	65/290	65/290	65/290	70/270	70/280	30/310*
Density, ρ	0.978	0.997	0.966	0.976	1.005	1.298	1.005	1.330

(*) Followed by 120/310°F. in open steam and 24 hrs./212°F. in air.

TABLE III—RESULTS OF TESTS ON VARIOUS GUM SPECIMENS

Rubber	Resonant Frequency V_o (cps.)	Corrected Velocity C_o (cm/sec.)	Real Modulus E_1 (dynes/cm²)	Loss Factor $\frac{E_2}{E_1}$
Natural	332	4650	21×10^6	0.14
	414	4790	22×10^6	0.15
	527	4820	22×10^6	0.20
	726	4950	23×10^6	0.24
	1178	5100	23×10^6	0.32
GR-S 1000	472	6580	40×10^6	0.30
(23.5% styrene,	583	6720	42×10^6	0.33
polym. temperature 122°F.)	746	6810	42×10^6	0.34
	1043	7090	45×10^6	0.39
	1736	7550	49×10^6	0.47
GR-S 1015	365	5120	24×10^6	0.28
(3% styrene,	457	5270	25×10^6	0.33
polym. temperature 125°F.)	596	5440	26×10^6	0.34
	854	5800	30×10^6	0.36
	1368	5930	31×10^6	0.38
GR-S 1023	473	6630	41×10^6	0.24
(13% styrene,	581	6740	42×10^6	0.27
polym. temperature 122°F.)	759	6940	44×10^6	0.26
	1045	7130	47×10^6	0.28
	1735	7880	56×10^6	0.33
GR-S 1500	422	5880	33×10^6	0.29
(23.5% styrene,	521	5990	33×10^6	0.33
polym. temperature 41°F.)	679	6190	34×10^6	0.38
	960	6530	37×10^6	0.45
	1530	6630	41×10^6	0.52
Thiokol ST	359	5030	29×10^6	0.45
	437	5070	29×10^6	0.47
	582	5340	32×10^6	0.47
	765	5260	30×10^6	0.51
	1312	5950	38×10^6	0.53
Hycar 1014	475	6680	40×10^6	0.42
	609	7020	43×10^6	0.46
	765	7070	42×10^6	0.52
	1180	7867	49×10^6	0.63
	1848	8200	48×10^6	0.76
Neoprene GRT	461	6470	42×10^6	0.67
	573	6670	43×10^6	0.75
	779	7160	44×10^6	0.92
	1082	7400	44×10^6	1.01
	1775	8080	46×10^6	1.18

modulus when the black loading was raised from 10 to 30 volumes. In this connection, it would be interesting to know the loss factors at loadings below 10 volumes, because somewhere in this region the loss factor must drop from 0.22 to 0.14, the value for the gum stock.

Tests at Various Temperatures: The specimen holder was placed in a refrigerated cabinet which could be held at any desired temperature below room temperature. The natural rubber gum specimen and the Neoprene GRT gum specimen, each approximately 2.75 inches long, were tested at 75°, 50°, 30°, 10° and −10°F. over the range of frequencies 0 to 1400 cps. The compression of the specimens was adjusted to 6% at room temperature to allow for thermal contraction at the lower temperatures, and thus bring the compression close to 2% at these temperatures. At each temperature the specimens were conditioned only for the length of time needed to attain the temperature, since it was desired to avoid crystallization. The conditioning time was determined by means of a dummy specimen with an embedded thermocouple. The approximate time for temperature equilibrium was 35 minutes.

The transmission curves are given in Figures 9 and 10. As the temperature decreased the internal viscosities of the rubbers increased, so the resonance peaks became less pronounced. At 50°F. the 1½ wavelength resonance of the natural rubber specimen was not found. At 30°F. the 1 wavelength resonance was barely noticeable. At 10°F. only the ½ wavelength resonance was obtained, and it was quite flat. At −10°F. there was a great increase in amplitude at resonance, but the resonance peak was very flat due to high internal viscosity. The latter behavior was probably a manifestation of the onset of the second order transition at these high frequencies.

In the case of the neoprene specimen, no resonances other than that for the ½ wavelength were observed at any of the temperatures. The resonance peak was flat at 50°F., and at 30°F. the peak was even less pronounced but had a high amplitude. This latter behavior was similar to that of the natural rubber specimen at −10°F.

The dynamic mechanical properties of these specimens at the various temperatures are tabulated below. These data show that the real modulus of both stocks decreased as the temperature was lowered, but the loss factor increased greatly:

Rubber	Temp. (°F.)	Resonant Frequency V_o (cps)	Corrected Velocity C_o (cm/sec.)	Real Modulus E_1 (dynes/cm²)	Loss Factor $\frac{E_2}{E_1}$
Natural	75	356	4680	21×10^6	0.15
	50	363	4780	21×10^6	0.30
	30	391	5140	17×10^6	0.84
	10	500	6580	5×10^6	5.40
Neoprene	75	500	6750	46×10^6	0.68
	50	629	8490	33×10^6	1.91
	30	1071	14460	10×10^6	14.80

TABLE IV—RESULTS OF TESTS ON SPECIMENS OF NATURAL RUBBER STOCKS LOADED WITH VARIOUS MATERIALS

(2.75-inch specimens)

Loading Material	Loading Amount Vols. per 100 vols. Rubber	Density, ρ (g/cm³)	Resonant Frequency, V_o (cps)	Corrected Velocity, C_o (cm/sec.)	Real Modulus E_1 (dynes/cm²)	Loss Factor $\frac{E_2}{E_1}$
None	0	0.978	332	4650	21×10^6	0.14
Circo LP Oil	10	0.973	299	4170	17×10^6	0.12
	20	0.971	274	3810	14×10^6	0.15
	30	0.969	250	3470	12×10^6	0.14
Thermax	10	1.053	364	5090	27×10^6	0.13
(MT black)	20	1.113	406	5680	35×10^6	0.16
	30	1.167	454	6360	46×10^6	0.19
Shawinigan	10	1.050	543	7590	59×10^6	0.20
(Acetylene	20	1.109	917	12840	176×10^6	0.23
black)	30	1.160	1546	21740	529×10^6	0.22
Micronex	10	1.053	493	6900	48×10^6	0.22
(MPC	20	1.111	955	13460	193×10^6	0.25
black)	30	1.159	1540	21750	528×10^6	0.23
Philblack E	10	1.051	555	7750	61×10^6	0.22
(SAF	20	1.108	1274	17860	337×10^6	0.26
black)	30	1.164	1945	27270	832×10^6	0.24

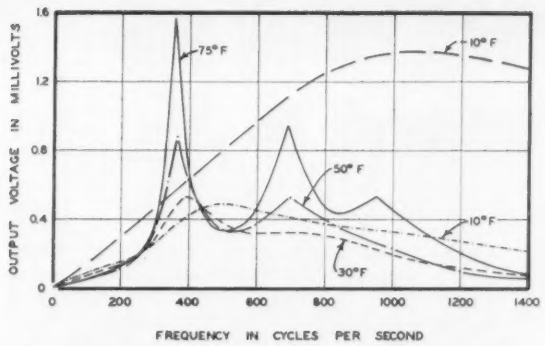

FIG. 9—Resonances in 2.75-inch specimens of natural rubber gum stock at various temperatures.

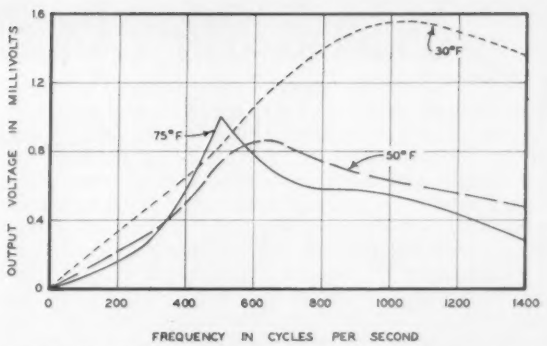

FIG. 10—Resonances in 2.75-inch specimens of Neoprene GRT gum stock at various temperatures.

The decrease of real modulus with temperature is in line with the theory that the elastic property of rubber is an entropy effect *(6)*.

Discussion

The only published information that is comparable to any of the data reported here is that given by Nolle *(9)* for a natural rubber gum vulcanizate. By interpolating the curves which he gave for real modulus and loss factor at 50°F., the following comparison is made at a frequency of 363 cps:

	Real Modulus E_2 (dynes/cm²)	Loss Factor $\frac{E_2}{E_1}$
Nolle	26×10^6	0.31
Present work..	21×10^6	0.29

This is considered to be good agreement, particularly since Nolle's stock contained 5 parts of sulfur and no softener, whereas the authors' stock contained only 1.5 parts of sulfur and 3 parts of softener. Nolle's stock would be expected to have higher modulus and loss factor because of these differences in composition.

This method of measuring the dynamic properties of rubber has the advantages of convenience and good precision, at least in the case of specimens with a low loss factor. Its principal disadvantages are its limited frequency range and the need for specimens of different lengths to obtain dynamic properties at desired frequencies. It is believed that this test method is particularly suitable for specification testing of rubber vulcanizates to be used in mountings intended for isolating the sound of machinery.

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SPECIAL NOTE

The opinions or assertions contained in this article are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval service at large.

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(10) Witte, R. S., Mrowca, B. A., and Guth, E., *J. App. Phys.*, Vol. 20, p. 481 (1949).

A low cost **high frequency rotating generator** that is said to break the ultrasonic barrier to rubber, plastic and paint processing has been announced by Acoustica Associates, Inc., Glenwood Landing, L.I., N.Y. The new units range in size from two to 150 kilowatts. The alternators are capable of supplying power for energizing multiple arrays of above audible sound generating transducers needed to irradiate materials and products being processed en masse. The Company is able to supply various sized production systems consisting of banks of magnetostrictive or ceramic-type piezoelectric transducers which may be submersed or externally mounted in existing equipment.

A new hydraulically controlled packing bench, which can be tilted to set boxes weighing up to 1000 pounds on the floor after they have been packed, has been announced by Valley Craft Products, Inc., 770 Jefferson Avenue, Lake City, Minnesota. Called the **Hydra-Tilt Table,** this new packing bench is said to have a hydraulic cylinder incorporated in its design that allows the operator to automatically tip the load from table to floor by a control lever. Heavy pieces of equipment can be placed on the table by use of a monorail and hoist, the company says, and can then be boxed at convenient working height and tilted to the floor so that they can be trucked away. Large quantities of small objects can also be efficiently boxed.

Continuous Processing of Reclaimed Rubber

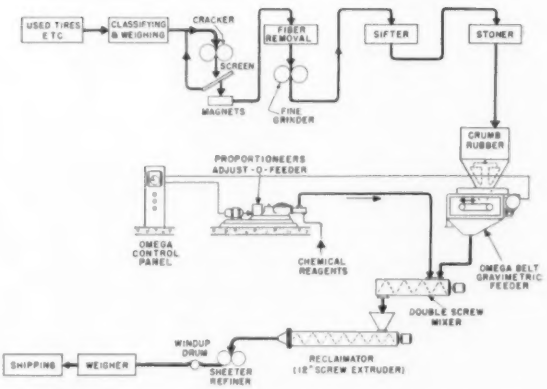
A METHOD for the continuous processing of reclaimed rubber, which is reported to cut processing time from ten hours to a few minutes, is said to have been worked out by Proportioneers, Inc., and Omega Machine Co., both divisions of B-I-F Industries, Inc., of Providence, R. I. The success of the process is said to be dependent upon accurate proportioning and feeding of crumb rubber, plasticizing agents and softening oils.

As indicated by the accompanying flow chart, used tires are cracked on a corrugated roll mill to one-half inch pieces. These pieces are screened and then move over magnetic separators for removal of steel bead wire. They then pass into a mechanical fiber removal system. The resulting fiber-free scrap is further ground to 20 mesh crumb, sifted, re-screened for removal of non-magnetic glass, stone, etc., and finally conveyed to large storage bins.

A belt gravimetric feeder continuously weighs and feeds this crumb rubber into a special double screw mixer, while special pumps continuously meter plasticizing agents and softening oils into the same mixer. The resulting pre-mixed crumb is continuously fed into a reclaimator (a 12-inch screw extruder having heating and cooling zones) where the rubber crumb is compressed, worked mechanically, and heated to 350°F. under which conditions devulcanization takes place. The extruded rubber sheet is then cooled, wound up, cut to proper thickness, dusted with whiting, and made ready for shipment.

The belt gravimetric feeder, made by Omega Machine, continuously feeds the 20 mesh crumb rubber. Hopper agitators prevent arching and packing of the rubber at this stage and insure constant flow to the feed tray. A 100 to 1 feed range, over and under weight alarms, explosion-proof construction, remote feed rate adjustment, and proportional pacing accessories are featured.

The contribution of Proportioneers, Inc., to this system includes the Adjust-O-Feeders or Treet-O-Units,



Flow sheet for the continuous processing of reclaimed rubber.

which are proportionally paced from the gravimetric feeder by either pneumatic or electrical systems. Pneumatic or electrical remote feed rate controls for the gravimetric feeder are also used. All controls, as well as recorders, are mounted on a totally enclosed control panel placed in a convenient location.

Advantages claimed for the new continuous processing of reclaimed rubber include the following: (1) Increases production with lower power consumption; (2) Eliminates expensive, variable manual operations; (3) Maintains more uniform quality product; (4) Minimizes fire hazards; (5) Allows economical recovery of by-products. Although designed for the reclaiming of rubber, the system, with modifications, may also be used in the manufacture of thermoplastic molding powder. The manufacturers also claim it finds application directly in the rubber manufacturing field.

Coming Next Month ...

"The Morphology of Synthetic Cis-Polyisoprene (Coral Rubber)"—by Ernst A. Hauser, Massachusetts Institute of Technology, Cambridge, Mass.

This article is a continuation of the morphological studies of synthetic elastomers which appears in the current issue. For the first time, detailed morphological studies of Firestone's Coral Rubber are reported and its morphology compared with that of *Hevea brasiliensis* crepe rubber. The studies show that the two elastomers are absolutely comparable in their morphologies.

"Ultra Accelerators in CV Vulcanization"—by L. A. Brooks, J. L. Tronson and A.C. Rowley, R. T. Vanderbilt Co., East Norwalk, Conn.

A comprehensive review of recommended accelerator systems for CV vulcanization combined with a report on recent investigations to determine proper temperatures where the ultra accelerators are concerned. History, theoretical considerations and applications are covered.

"Gauge Control in Calendering of Vinyl Films and Sheeting" — by M. Jukich, Goodyear Aircraft Corp., Akron, Ohio.

A report on how Goodyear secured good transverse film gauge or profile when it increased its facilities for the production of vinyl film and sheeting. Problems faced and the solution methods achieved are detailed.

"Mass Production of Half-Track Treads"—by William B. Brown.

How surplus half-track treads from the armed services are recapped and put back into active use. Also discussed in this illustrated article are various types of equipment used in the recapping of these treads.

Plus several short practical articles.

How Various Carbon Blacks Are Handled at Goodyear's Topeka Plant

FEW raw materials in the rubber industry are handled, at the manufacturing level, in such quantities as carbon black. In the handling of these materials, there is an opportunity for the manufacturer to reduce waste and inefficiency through the use of an effective materials handling system.

At the Topeka, Kansas plant of the Goodyear Tire and Rubber Co., the materials handling problem was the conveying of six different types of black from the rail siding to the Banburys located within the plant. The problem could have been solved by the installation of large silos and mechanical conveying equipment. However, due to ever-changing processing requirements, the company wanted something more flexible and wanted to avoid a high capital investment if possible. They chose Tote Bins and Tilts, manufactured by Tote System, Inc., Beatrice, Nebraska, tied in with their existing handling equipment. The result is a completely flexible system, one that is adaptable to any future process changes.

The Topeka plant uses approximately two rail bulk hopper carloads of six different types of carbon black per day. As the black arrives at the plant, it is discharged at the outdoor unloading station (Figure 1) where screw conveyors feed the material to a bucket elevator and then to a staggered offset conveyor that runs to the inside of the building.

The black is then fed into 92-cubic foot bins with an over-all height of seven feet. The units, called Tote Bins, are lined up beneath the overhead conveyor. The plant's multiple filling station (Figure 2) is able to handle thirteen containers which hold a total of 26,000 pounds of carbon black. The carbon black flows from the mechanical conveyor into the bins through a flexible connection that fits tightly to the top of each bin and is attached to a spout in the bottom of the conveyor by means of a nylon sock. When the unit is full, the connection is twisted to stop the flow of black and is raised high enough above the unit to permit interchange by lift truck. As each bin in the line fills, the carbon black is carried over to the next one and on down the

FIG. 1—The hopper car at the right is shown in position at the outdoor unloading station. Black is conveyed from the car by conveyor lines to inside the building.

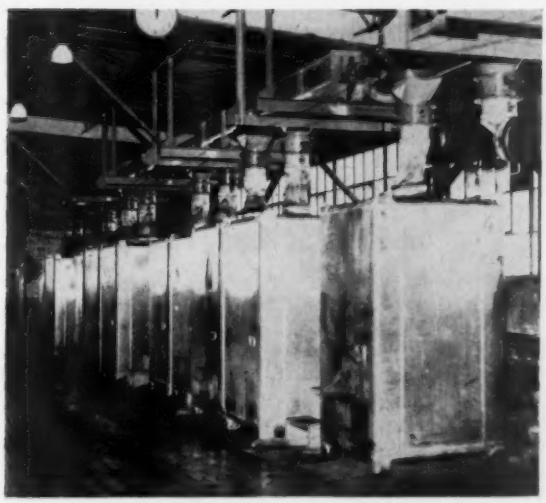


FIG. 2—Shown above is a row of thirteen bin filling stations. Carbon black is discharged from overhead conveyors into the bins through flexible connections.

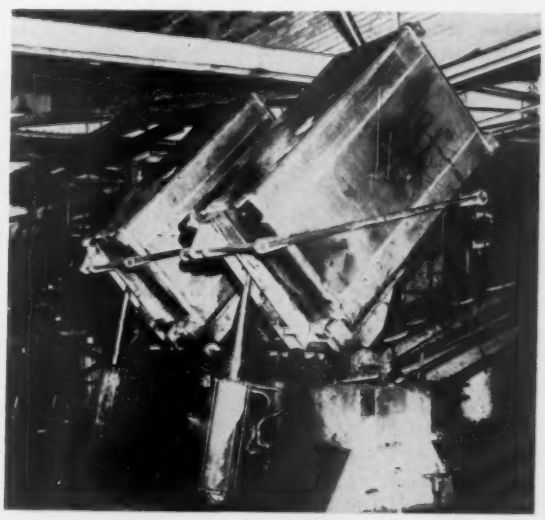


FIG. 3—Bins tilted at a 45° angle permit the black to flow out by gravity through an opening in the tilt mechanism. The black is then moved to weigh hoppers.

line until one compartment of a car has been unloaded. The loaded bins are then conveyed to a warehouse and replaced with empties.

As needed, a fork-lift truck moves the bins from the storage area to a discharge station. At present, the plant has two stations feeding four Banburys. The discharge station, called the Tote Tilt station, converts the bin to a discharge hopper by tilting it to a 45° angle (Figure 3). In this position, a hinged door at the front of the container opens, permitting the black to flow out by gravity through an opening in the tilt mechanism. The carbon black is then moved into an adjacent room by means of an incline conveyor which feeds the weigh hoppers located over the Banburys.

The tilting units are equipped with air cylinders for fast and easy operation and with Syntron vibrators to aid in the flow and proper discharge of the black.

In order to remove half-emptied bins from the discharge station so that another type of black can be fed from the same station, a baffle was installed inside the bin. This permits closing of the bin discharge door and removal of the partially-emptied bin from the tilt unit.

Advantages claimed for this materials handling system include its dustless operation, convenience, and automatic performance. Goodyear's Topeka plant has 165 Tote bins in service.

Production of Nitrile Latex Foam

RECOGNIZING the need for a soft sponge structure with maximum oil and solvent resistance, the Vanderbilt Latex Laboratory at East Norwalk, Conn., has concentrated recent development efforts on producing a product of this type. Nitrile foam produced by frothing the properly compounded latex, instead of by adding chemical blowing agents to highly plasticized dry elastomer to obtain a soft sponge, appears to be the answer for a number of applications. Upholstery fabric backing where cleaning fluids would attack natural or GR-S latex foam should be of particular interest. Articles used in contact with the human body, and in industrial applications where oils, fuels or solvents would swell and deteriorate non-resistant foam or sponge, can also be made from this new material.

The materials used for compounding are added in the order listed in the accompanying formula. Nitrile latex is supplied ready for compounding and needs no adjustment of ammonia content as in the case of natural latex. Nytal 300 is added directly to the compound with efficient agitation. 65% castor oil emulsion is supplied for latex compounding by the Vanderbilt company. Maturing of the compound prior to frothing does not appear to be necessary with nitrile latex.

The sodium silicofluoride, which acts as the gelling agent, is added near the end of the whipping operation in open batch process mixing. It is advisable to reduce the whipping speed when the gelling agent is added. In continuous processing with the Oakes foaming equipment, the gelling agent is added through the proportioning pump to the compound as it goes through the blender or mixing head. Wet density range of the foamed compound can be varied between 100 and 250 grams per liter, depending on the quantity of air introduced in the frothing operation.

FORMULA FOR NITRILE LATEX FOAM

	Dry	Wet
Nitrile Latex (54% Solids)	100.0	185.0
20% Potassium Oleate Soap	.5	2.5
Zinc Oxide	3.0	
Sulfur } C-428 Dispersion	2.0	12.0
Agerite Stalite	1.0	
50% Zetax Dispersion	2.0	4.0
50% Butyl Zimate Dispersion	.25	.5
50% Trimene Base Solution	1.0	2.0
Nytal 300	25.0	25.0
65% Castor Oil Emulsion	2.0	3.1
20% Sodium Silicofluoride Dispersion	2.0	10.0

NITRILE LATEX FOAM PROPERTIES

(Tests Conducted According to R.M.A. Specifications)

	Oven Cured	Steam Cured
Density (Grams/Liter)	125	108
25% Compression Modulus (Lbs./50 Sq. In.)	16.7	21.0
% Change in Compression after 22 Hrs. at 212°F.	+25	+17.7
Static Fatigue	No Cracking	No Cracking
Air Bomb Resistance (6 Hrs., 60 Lbs., 260°F.)	O.K.	O.K.
% Compression Set	26.6	25.0

One formula weight of the compound as listed in grams makes a satisfactory sized batch for handling in the 3 quart bowl of the Hobart Mixer. In laboratory production with the Oakes 10M5 Continuous Mixer, a minimum batch size of 10 gallons is required for a satisfactory run. In the Vanderbilt laboratory, the compounded latex feed rate in continuous operation is 3 pounds (wet) per minute.

Vulcanization of the foamed nitrile latex compound in ½-inch slab thickness takes place in 40 minutes at 240°F. in dry heat or 30 minutes at 212°F. in open steam. The steam-cured product shows minimum tendency toward discoloration. Average shrinkage in slab stock cured in dry heat on aluminum plates is approximately 33 per cent on the vertical axis, and 6 to 8 per cent horizontally.

Hull-Standard Molding Press

Hull-Standard Corp., Abington, Penna., has announced the development of a new and improved toggle-type hydraulically-actuated molding press with a minimum opening and closing time of two seconds. This high speed action is said to be ideal for alkyds and is also reflected in increased production with other plastics. It is obtained with new type, high-speed differential cylinders which operate four times as fast as in previous models with the same power requirements. Features of the press include such items as a new quickset sequence-type cycle controller which dials operations, a compact, totally-enclosed and self-contained power unit with water-cooled oil reservoir, a top and bottom ejection and a main cylinder that is valve-cushioned at both ends of the stroke.

Editorials . . .

Industry Policemen

AS a general rule, public hearings by Congressional committees rarely turn up any new or startling information. However, every once in a while some clue to government or industry performance is gained from these hearings. Such was the case during the recent hearings held by the Fulbright Committee in Washington on the proposed sale of the synthetic rubber facilities at Institute, West Virginia, to Goodrich-Gulf Chemicals, Inc.

During the testimony of officials from the Department of Justice, which is concerned with the question of industrial monopoly, it was revealed that instructions have been issued to the Federal Bureau of Investigation to keep close tabs on the operators of the formerly government-owned synthetic rubber producing facilities. Specifically, the FBI has been charged with seeing to it that the private producers of synthetic rubber maintain their promises to supply the smaller consumers with adequate rubber and to maintain a competitive industry. The initial findings of the Bureau will be reported to the Senate Banking Committee on May 1 and annual reports will be made every year until 1965.

We have often referred to the fact that through some peculiar coincidence the rubber industry seems to be a guinea pig, and once again it is assuming that role. We are not implying that the government does not have the right to ride herd on the newly-formed private-producing synthetic rubber industry, but we fail to see the necessity for "police" action. We doubt that any purchaser of one of the government facilities has any intention of reneging on a promise, especially one written into the books. Further, the smaller consumers would be quick to look toward their Senators and Representatives if promised supplies failed to materialize. Oh, well, here we go again.

Growth Potential

ONE of the important sources for rubber statistics, one which industry fails to use to full advantage, is the Chemical and Rubber Division of the Business and Defense Services Administration of the Department of Commerce. The Rubber Branch of this Division is constantly accumulating data on tires and tubes, mechanical goods, footwear, clothing, drug sundries, and the multitude of other products turned out in substantial quantities by the rubber manufacturing industry.

In one of its regular monthly reports, this government agency recently commented on the growth of the rubber field. It indicated that, numerically, the number of rubber manufacturing plants in the United States increased 28 percent to 1,196 units between 1947 and 1953 and added that, proportionately, this growth is nearly three times greater than the advance shown for all manufacturing industries combined. The report added that nearly half of the rubber manufacturing plants had less than 20 employees, that two-thirds had less than 50 employees, and that about one-fourth of the plants had 100 or more.

Our own figures, based on our work with the RUBBER RED BOOK, indicate an even greater percentage gain from 1947 through 1955. In 1947, there were 1,127 rubber manufacturing plants in operation in the United States as compared with 1,511 plants at the end of 1955, or an increase of 35 percent. Just for the records, every single issue of our directory since the first edition in 1935 has shown a gain in the number of rubber manufacturing plants included.

Malayan Independence

ACCORDING to recent statements in the press, British and Malayan negotiators have reached general agreement on a two-stage program to make Malaya an independent state inside the British Commonwealth within the next two years. As a first step, the government at Kuala Lumpur will be given full control over internal affairs. Until the final step is reached, Malaya will remain a colony. It is a little too early to speculate on the over-all effect of complete Malayan independence on England's ability to deal in dollars, but no one needs reminding of Malaya's rubber position where dollars are concerned. We are reasonably sure such considerations are part and parcel of the present negotiations.

Highlights Sidelights *of the News . . .*

February, 1956

Final sale of the Institute, West Va., synthetic rubber facility to Goodrich-Gulf Chemicals, Inc., now hinges upon Congressional approval . . . The Disposal Commission's recommendation to Congress came with the qualified approval of the Department of Justice . . . The Attorney General expressed the opinion that were this a private transaction rather than a sale by the government subject to Congressional review, he would be inclined to hold up the sale in order to study the legal aspects more closely . . . As the Congress will have the final say, however, he was willing to express the opinion that the sale is legal (page 737).

Two bills have been introduced in Congress, one in the House and one in the Senate, authorizing outright sale or long-term lease of the government-owned alcohol-butadiene plant at Louisville, Ky. . . . The bills offer the plant on a competitive bid basis and call for the negotiation of either an outright sale or a fifteen-year lease . . . The Louisville facility is the only one of twenty-seven facilities originally put up for sale which has not been sold . . . The 60,000 ton a year unit has been operated by Publicker Industries, Inc., since last March under a three-year government lease (page 738).

The Rubber Producing Facilities Disposal Commission has made available a financial resume of the disposal program to date which indicates the program produced a recovery in excess of the total net cost totaling $22,538,000 . . . It is shown that the total return to the government approximates $447,000,000 (page 737).

The Federal Trade Commission has charged Firestone, Goodyear and Goodrich and three oil companies with entering agreements to restrict competition in the sale of tires, batteries and automobile accessories through stations affiliated with the oil firms . . . These contracts, FTC charges, violate the Federal Trade Commission Act . . . FTC complaints are answerable to the Commission itself . . . Hearings have been slated in Washington, D. C., on March 20 to 22 (page 740).

A subcommittee of Committee D-11 on Rubber and Rubberlike Materials, A.S.T.M., has announced its recommendations as to the establishment of types of synthetic rubber . . . The subcommittee recommendations follow the original numbers used by the government . . . Provision has been made for non-conforming butadiene-styrene and polybutadiene polymers (page 748, 749).

NEWS REPORTS and Industry Activities

CONGRESSIONAL DECISION PENDING ON INSTITUTE; NEW BILLS CALL FOR SALE OF BUTADIENE PLANT

TRANSFER of the Institute, West Va., synthetic rubber facility to Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, now hinges upon whatever action the Congress chooses to take. On January 12, the Rubber Producing Facilities Disposal Commission recommended the sale of the Institute plant to Goodrich-Gulf. The sale price of $11,000,000 offered by the company was the highest of six bids offered. In addition, the purchaser will pay an estimated $330,000 for spare parts and equipment. According to law, Congress had thirty days from January 12 in which to review the sale. If the sale is not disapproved, it is expected that Institute will be transferred to Goodrich-Gulf by mid-February.

The Disposal Commission's recommendation to Congress came with the qualified approval of the U. S. Department of Justice. While the Disposal Commission said it "firmly believes" that sale of the Institute plant will "insure continued strong competition in synthetic rubber manufacture", Attorney General Brownell said he would be inclined to hold up the transaction if the government were not involved, in order to study its legality.

Mr. Brownell said: "Were this a private transaction rather than a sale by the government subject to the review by the Congress, I would probably request a federal judge to enjoin consummation pending a determination of legality by the court." But, he added, since Congress "will have the final say, he was willing to express the opinion" that the sale is legal.

Brownell Offers Opinion

Mr. Brownell said the sale does not threaten to create a monopoly nor substantially lessen competition among synthetic rubber producers. Acquisition by Goodrich-Gulf, he said, will raise that firm's synthetic rubber capacity to 212,000 long tons annually, lifting its share of capacity from 12.3 to 25.5%. He agreed, however, that expansions by other producers will reduce this figure to less than 20% in the next few years.

Hearings on the sale of the Institute plant began on February 1 by the Senate Banking and Currency Committee under Chairman Fulbright (Dem., Ark.). Senator Fulbright said that the recent anti-trust violations filed by the Federal Trade Commission against several major rubber companies, including the B. F. Goodrich Co., are a "warning signal" that the inquiry is essential.

William I. Burt, president of Goodrich-Gulf, stated: "We are confident that the proposed hearings of the committee will establish the validity and fairness of our bid. We feel sure that the operation of this important facility by Goodrich-Gulf is essential to the national defense and will provide for the development of a free, competitive, man-made rubber industry which is in the best interests of the rubber consuming public."

In its report to Congress, the Disposal Commission summarized the financial return to the government from the entire disposal program as in excess of $447,000,000, and cited the statutory requirements of the disposal legislation which guided the commission in recommending the sale of the Institute plant. Salient points made in the report were:

(1) The government will receive a full fair value for a facility which has not operated since September 1953, and which costs the government approximately $240,000 a year to keep in standby. The contract sale price is more than $6 million above the net book value of the plant as of October 31, 1955.

(2) The bid of Goodrich-Gulf was the only offer before the Commission which represented full fair value. The alternative to sale to that company was the continuance of the Institute plant in standby condition.

To Insure Competition

(3) Operation of this plant by Goodrich-Gulf in the opinion of the Commission will insure continued strong competition in synthetic rubber manufacture. With the acquisition of this plant, Goodrich-Gulf will have about 19.9 per cent of the nation's GR-S synthetic rubber capacity, in view of the announced expansion plans of the synthetic rubber plants. Expansion plants already announced or under way will bring this capacity up to 1,091,900 long tons.

(4) Goodrich-Gulf has agreed to make available to small business enterprises 81,000 long tons of the 122,000 long ton productive capacity of the plant.

(5) Production of this plant, with an assigned annual capacity of 122,000 long tons of synthetic rubber, is important in the face of the sharply rising demand for this product. This demand is taxing the productive capacities of the nation's synthetic rubber making facilities. Reactivation of the Institute plant will be an added bulwark to national defense. The plant will

FINANCIAL RESUME OF SYNTHETIC RUBBER DISPOSAL PROGRAM

Net book value (Cost less depreciation) of all capital assets		$127,617,000
All plants and other assets except the Institute plant	$122,649,000	
Institute plant	$ 4,968,000	
Accumulated deficit during entire period of Government operation (Debit in Profit and Loss account)		$134,693,000
Total remaining investment or net cost		$262,310,000
Amount realized from Disposal Program		
Sale of all plants (except Institute) and the tank cars		$273,848,000
Sale of Institute plant		$ 11,000,000
Total amount realized		$284,848,000

be sold with a National Security Clause in the contract of sale which guarantees that it will be available for the production of rubber for ten years.

(6) The plant drew no bids in the original disposal program reported to the Congress last January. It is recommended for sale as the result of special legislation. The opportunity to dispose of it at the recommended price may never recur.

(7) Reactivation of this plant will provide several hundred jobs in an area that has not fully shared in the peak employment payrolls of other industrial centers.

The Disposal Commission also presented a financial resume of the disposal program which appears on the preceding page. It will be seen from a study of the resume that the disposal program produced a recovery in excess of the total net cost of the program of $22,538,000.

With the completion of the disposal program, the government no longer will be engaged in the production and marketing of synthetic rubber. Therefore, the net proceeds of the plant sales coupled with the Federal Facilities Corporation's cash balance for the synthetic rubber program increased by cash proceeds of unsold net current assets, including liquidation of accounts receivable, and diminished by standby expenses and administrative and other costs will return to the government over $447,000,000. [As this issue went to press it was announced that both the House Armed Services Committee and the Senate Banking and Currency Committee have approved the sale of the Institute plant to Goodrich-Gulf. The measure now goes to the entire Congress for a vote. Complete details will follow in our next issue.]

Alcohol-Butadiene Plant Sale?

While major interest centered about the Institute plant, two bills were introduced, one in the House and one in the Senate, authorizing outright sale or long-term lease of the government-owned alcohol butadiene plant in Louisville, Ky. The bills would offer the plant on a competitive bid basis and negotiate either an outright sale or a 15-year lease.

The 60,000 ton a year facility has been operated since last March by Publicker Industries, Inc., of Philadelphia, Penna., under a three-year government lease. Publicker reportedly wants to expand operations at the plant after the current lease expires, but feels that sale or a long-term lease would be required to justify the cost of the necessary additional capital investment.

Ascot Chemical Formed in N. Y.

According to a joint announcement by Harold Holden, president of the Eastern Corp. of Bangor, Me., and E. S. & A. Robinson, Ltd., of Bristol, England, Ascot Chemical & Adhesive Corp. has been formed under New York State laws with an initial paid-in capital of $1,000,000. It is planned that the new company will establish a plant in the metropolitan New York area this year to manufacture a broad line of plain and pressure-sensitive transparent tapes.

Young Elected RTA President

R. D. Young was recently elected president of the Rubber Trade Association of New York, Inc., for the thirteenth consecutive year. Other officers of the association are: *Chairman,* F. J. Jackson (Hecht, Levis & Kahn); *Vice-Chairman,* Herman Weinstein (Paul Elbogen); *Treasurer,* Robert Badenhop (Robert Badenhop Corp.); *Secretary,* Arthur J. Garry; *Assistant Treasurer,* Joseph J. Dwyer. The board of directors of the association, in addition to the Messrs. Young, Jackson, Weinstein and Badenhop, includes F. T. Koyle (Carl M. Loeb, Rhoades), Harold E. Poel (H. A. Astlett), S. J. Pike (S. J. Pike & Co.), S. E. Brennan (H. Muehlstein); W. B. Rothschild (M. Rothschild), and Fred Thurkauf (Jacobus F. Frank). The membership of the association at the present time includes 29 dealers and 22 brokers and agents.

New SAMA Standards Available

The Scientific Apparatus Makers Association, Chicago, Ill., has announced the availability of five recently-published SAMA standards: RC4-10 1955 "Bimetallic Thermometers"; RC5-10 1955 "Resistance Thermometers"; RC6-10 1955 "Filled System Thermometers"; RC7-10 1955 "Glass Stem Industrial Thermometers," and RC8-10 1955 "Thermocouple Thermometers (Pyrometers)." Copies of these SAMA standards may be obtained without charge from Hampton M. Auld, Executive Secretary, Recorder-Controller Section, Scientific Apparatus Makers Association, 522 Fifth Ave., New York 36, N. Y.

Spalding-Rawlings Merger Status

The Federal Trade Commission states that A. G. Spalding & Bros., Inc., Chicopee, Mass., has agreed to give advance notice if it decides to carry out its announced merger with Rawlings Manufacturing Co. of St. Louis, Mo. The commission charged in December that Spalding's acquisition of Rawlings violated the so-called anti-merger section of the Clayton Antitrust act by threatening to weaken competition in the sporting goods field. Spalding's agreement, FTC said, "will insure maintenance of the status quo" while the commission complaint is pending. The agreement was made after the commission sought an injunction in the Federal Court of Appeals in Boston to halt Spalding from carrying out the merger. Under the agreement, the commission's court action will be dropped. Spalding's action means that even though its stockholders have approved the acquisition, it will delay actual physical taking over of Rawlings by Spalding.

Carbide Research Appointments

Several changes in the Research Department of the Carbide and Carbon Chemicals Co., New York, N. Y., have been announced by Dr. G. H. Law, director of research for the company. Dr. W. N. Stoops has been appointed associate director. Dr. H. C. Chitwood, B. J. Cottrell, Dr. Benjamin Phillips, G. M. Powell, and A. T. Walter have been appointed assistant directors. Dr. D. M. Young has been appointed assistant to the director of the Research Department and will be located in the New York office of the company.

COLUMBIA-SOUTHERN CONSTRUCTING NEW RESEARCH LABORATORY BUILDING

Columbia-Southern Chemical Corp., Pittsburgh, Penna., has announced plans for an extensive expansion of research and development work at the company's Barberton, Ohio, plant. According to company officials, the program will cost in excess of a million dollars and will include the construction of an ultra-modern research building. The new research unit, containing about 40,000 square feet of floor space, will be located adjacent to the company's extensive chemical manufacturing facilities at Barberton. It will have three floors plus a basement and will include a library and conference room in addition to laboratories and offices. Design in the laboratory wing follows the modular plan for individual one or two-man laboratories. Bench-scale research will be performed in the new unit. The existing laboratory quarters will be used primarily for applications research and analytical work when the new unit is completed early next year. Laboratory tools, including advanced X-ray diffraction equipment, emission, infrared and ultraviolet spectrographic equipment and electron microscopes—will be utilized in the new unit. A small "hot" laboratory for experiments with radioactive materials will be included in the new facilities. Shown above is an architect's rendering of the new building.

ONTARIO SECTION HEARS COOKE ON RUBBER AND PLASTICS COLORS

The January 10th meeting of the Ontario Rubber Section of the Chemical Institute of Canada, held at the Pickfair Restaurant in Toronto, Ont., Canada, was attended by approximately 100 members and guests. Principal speaker at the meeting was James N. Cooke, Jr., vice-president of the Cooke Color and Chemical Co., who spoke on "Colors in Rubber and Plastics."

Mr. Cooke said that of the many thousands of organic and inorganic colors manufactured, interest is centered in those relatively few colors that are compatible with rubber. The colors must be non-bleeding, non-migrating, and have a copper and manganese content below compatible limits. Inactive manganese is allowable up to 300 parts per million, but active or soluble manganese is deadly to any rubber compound in percentage exceeding 10 parts per million. Active copper is allowable up to 25 parts per million. An excess of either of these metals in masterbatch or in a finished compound will cause its rapid deterioration.

Organic and inorganic pigments may be used in either the dry form or as masterbatches. Masterbatching usually adds about 10 percent to color costs, but this slight additional cost is small as compared to the indirect savings effected. Colors, whether dry or masterbatch, should be incorporated during the rubber breakdown whenever possible.

Describes Matching Colors

In order to match a color, the shade desired must be analyzed for its various components. Is it a full-tone or an undertone? Is the color a true color or a blend of several shades? Is the color a clean shade or is it a dirty dull color?

If one desires a clean bright color, the choice will unquestionably be for an organic pigment. If on the other hand one is looking for a duller dirty shade, then consideration should be given to using less expensive and very stable inorganic pigments. Red oxide is an impossible color to beat for the shade and money value it produces. One must remember that the basic characteristic of the pigment can never be cleaned up and brightened even with the additional white light colored pigments. Dirtiness of shade will always remain.

In blending colors, one should keep in mind a color spectrum remembering the inter-relation of reds on one side through to yellows in the center, blending off through greens into blue, blue going into purple, and back again to red. In analyzing a color keep in mind a spectrum, he said. All primary colors have their medium shades. Yellow is orange on one side and green on the other, red having its orange side and blue side, blue having its red side and its yellow or green side. It is most important in blending colors to choose colors on adjoining sides of the medium shade line.

One cannot and need not carry all possible shades. Three or four good standard medium-shade primary colors with several secondary colors will allow one to make most any shade desired. A very handy secondary color is a good orange for blending with reds to make yellow shades and a good orchid or purple to make blues redder and reds bluer.

Several colors, particularly benzidine yellows and all organic reds that are normally stable and excellent colors in rubber, will fail completely when diluted below a certain critical point. If one needs a shade below the critical point increase the quantity of color and kill it with an excess of white, or use an inorganic color.

The public is becoming more and more color conscious. Perhaps color does not add to the quality of a product, but it certainly adds to its salability. Bright new clean colors properly incorporated into some of our everyday products are going to be directly instrumental in increasing sales. With proper compounding and proper choice of colors, almost any shade is obtainable in common rubber compounds. Correctly selected, wisely used, good colors are an unexcelled investment, Mr. Cooke concluded.

DEWEY & ALMY CHEMICAL CO. NAMES THREE NEW SALES REPRESENTATIVES

A. T. Zirpolo

M. B. Brown, Jr.

C. E. Larson

The assignment of three organic chemical sales representatives to central and eastern territories has been announced by the Dewey & Almy Chemical Co., Cambridge, Mass. Alexander T. Zirpolo has been named to represent the company in Ohio, West Virginia, Kentucky, eastern Indiana, and part of Michigan. Mr. Zirpolo received a B.S. degree from Georgetown University, and was formerly associated with Charles Pfizer & Co. He will report to John Broughton, the regional sales manager at the Chicago, Ill., office. M. Barclay Brown, Jr., has been assigned to New York State and New Jersey. Formerly with the National Lead Co., he served in the U. S. Air Corps during World War II. Carl E. Larson has been assigned to cover a territory in New York City and Long Island. A graduate of Wagner College with a B.S. degree in chemistry, Mr. Larson was formerly associated with the General Chemical Division of the Allied Chemical & Dye Corp. Both Mr. Brown and Mr. Larson will report to eastern regional manager, Tom Tarbox.

Foster Named to New Post

James L. Foster, associated with the B. F. Goodrich Chemical Co. since 1944, moved to a new assignment with Goodrich-Gulf Chemicals, Inc., on January 1. Mr. Foster is a native of Manhattan, Kansas, where he attended elementary and high school. He attended Kansas State college and was graduated in 1937 with a B.S. degree in industrial chemistry. He joined Goodrich Chemical in 1944 as a development engineer in the chemical laboratory. In 1949 he moved to the technical services department and in early 1950 was assigned to wire and cable material sales department as a technical representative, a position he retained until his present appointment.

Named Conference Chairman

The appointment of Walter J. A. Connor, vice-president and director of American Plastics Corp., a subsidiary of Heyden Chemical Co., as chairman of the technical conference on plastics to be held in New York City June 11-15 has been announced by Norman Anderson, president of the Society of the Plastics Industry, Inc., conference sponsor. The Conference will be held in conjunction with the Society sponsored Seventh National Plastics Exposition to be held at the new Coliseum here in New York that same week. According to Mr. Anderson, plans for the Conference include technical papers and presentations on the use of plastics in such areas as the automobile, transportation, packaging, textiles, tooling, refrigeration, furniture, radio and television industries. Special attention will also be paid this year to the needs and interests of retail buyers, he said. He stated that an important feature of the Conference will be the award of prizes to professional architects, draftsmen, and architectural students who have submitted outstanding designs in the currently held SPI sponsored plastics house competition.

Technical Division Manager

Walter J. Kaufman, associated with the Watson-Standard Co., Pittsburgh, Penna., since 1945, has been appointed manager of the Technical Division. Mr. Kaufman is a graduate of Grove City College, where he received his bachelor of science and chemical engineering degrees. When he first joined the company, he was assigned to the Manufacturing Department. Next, he entered the Sales Department and prior to his most recent appointment was in charge of technical sales.

FTC CITES TIRE AND OIL COMPANIES ON TBA SALES COMMISSION PACTS

The Federal Trade Commission, on January 12, charged three of the nation's top tire manufacturers and three major oil companies with entering agreements to restrict competition in the sale of tires, batteries and automobile accessories through stations affiliated with the oil firms. Linked together in the FTC charge were the Firestone Tire & Rubber Co. and the Shell Oil Co.; Goodyear Tire & Rubber Co. and the Atlantic Refining Co.; and B. F. Goodrich Co. and the Texas Co.

Through the agreements, FTC said, the oil companies "contract to influence unduly" their affiliated service stations and distributors to buy tires, batteries and accessories sold by the tire manufacturers. In return, FTC charges, the oil firms get an "over-riding commission" ranging from 5 to 10% from the tire makers from net sales through their service stations and distributors.

These contracts, FTC charged, violate the Federal Trade Commission Act in that they foreclose the tire manufacturers' competitors from the service station markets involved, deprive operators and distributors of freedom of choice in buying TBA products for resale to the public, and deprive the public "of the benefits of free competition".

The FTC complaints are answerable to the commission itself. Hearings on the complaints are slated before an FTC examiner in Washington, D. C., from March 20 to 22. After this, the examiner will reach an initial decision, which is subject to review by the full five-man commission. If it so decides, FTC may issue a cease and desist order against the agreements and can seek a court order to enforce it. The companies can appeal the order to the courts, too.

Cites Service Station Control

In addition to the charges against the contracts, FTC sharply criticized the complete control it said the oil firms exercise over service stations. This control, FTC said, enables the oil companies to influence and control the purchasing and marketing activities of the service stations and distributors. This has been a subject of considerable Congressional investigation in recent months.

The FTC complaint said the Texas Co. sells its products directly and through distributors to more than 42,000 service stations, while Shell and Atlantic sell to more than 22,000 distributors and 10,800 service stations. In all cases, FTC said, a substantial number of these stations sell TBA products.

Under the agreements with the oil firms, FTC said, tire manufacturers in return for the commissions got "influence and aid" from the oil companies in promoting sales in this "large and increasingly important market" of controlled outlets. For instance, FTC said that Firestone sold more than $14,000,000 of its products to Shell affiliates in 1953, for which Shell, through its over-ride commission of 7.5 to 10%, got more than $1,300,000.

Goodrich sold about $14,000,000 in products in 1952 under its contract with the Texas Co. for which the oil firm got $1,100,000 under its 5 to 10% commission. Goodyear gave Atlantic a commission of $411,743 based on sales of nearly $4,200,000 in 1952 to Atlantic stations and distributors. Atlantic's percent commission ranged from 7.5 to 10%, the Federal Trade Commission charged.

FTC also charged that similar contracts were made between Texas and Firestone, Atlantic and Firestone, and Shell and Goodyear. Firestone paid more than $446,000 in commissions to Atlantic in 1953 on sales of nearly $4,800,000, FTC said. Firestone also paid Texas commissions of more than $2,700,000 on sales of over $31,000,000 in 1953, FTC added. Goodyear, FTC stated, paid Shell more than $1,500,000 in 1952 on sales through Shell affiliates of nearly $16,600,000.

FTC also declared in its complaint that each tire manufacturer is alleged to have entered similar contracts with "other oil companies". The agency said Goodrich is alleged to have made agreements with five companies other than the Texas Co., and that under the agreements its sales went from $5,500,000 in 1946 to more than $16,500,000 in 1952.

FTC, however, would not name the "other oil companies". An official said contracts between the tire manufacturers and these other companies have been investigated, but the cases against the three major oil firms had been chosen as the strongest. It was noted that a favorable ruling for the FTC against the tire manufacturers, however, would probably outlaw all such agreements.

Firms Offer Own Views

In commenting on the FTC charges, the Goodyear Tire & Rubber Co. stated: "Until the text of the complaint is received, any comment will necessarily have to be in general terms. However, the company is confident that the sales commission plan eventually will be held not only legal but beneficial to the public and to the thousands of independent merchants which it serves.

"The tire industry long ago recognized that the network of service stations, created in response to the demand of the motoring public, offered ready-made distribution for the tires, batteries and automotive accessories which are natural companions to the petroleum products already handled in those stations.

"The sales commission plan, along with other methods of selling through such stations, has been in open operation for many years. This is believed to be the first attempt seriously to challenge its legality. Goodyear is confident that, when the facts have been fully developed in the hearings which are yet to be held, it will be made clear that the sales commission plan is not only legally sound but economically desirable in the public interest, and is a method of competition consistent with the free enterprise system."

The B. F. Goodrich Co. stated that it was surprised to learn that FTC had filed a complaint challenging the legality of payment of a commission to a petroleum company for sales services. The company said that: "Payment of such commissions has been openly and widely practiced in the tire industry for more than 20 years. The complaint is inconsistent with the position of the Federal Trade Commission in an earlier case involving another tire company. We shall vigorously contest the complaint."

The Firestone Tire & Rubber Co., on January 13, issued the following statement: "The Sales Commission Plan entered into between tire manufacturers and marketing oil companies is legal and is in the public interest, as it promotes competition and helps thousands of small independent service stations. The Sales Commission Plan of marketing tires, batteries and accessories started about twenty-five years ago and has been widely and openly used by a number of tire manufacturers and oil companies to better serve independent dealers and consumers. The Plan is the same today as it has been for many years. It has been investigated by the Government a number of times and never before challenged. The test cases commenced against three tire companies and three oil companies are based on a new and novel theory under an old statute. Firestone has confidence that after all Government and company witnesses have testified in public hearings, it will become clear that the Sales Commission Plan is legally and economically sound and is in the public interest."

S. C. Bartlett, vice-president in charge of domestic sales of the Texas Co., said: "The Texas Co. feels that its sales commission plan is fair and proper, and that it serves the best interests of its dealers and the motoring public.

"We have recommended that our dealers purchase tires, batteries and accessories from companies having national distribution because such companies carry a complete line of high quality automotive products to meet practically all the needs of the motorists.

"However, our dealers are free to purchase tires, batteries and accessories from any other source and we reaffirmed this long standing policy as late as December, 1953, when the following statement was issued to our organization:

"It should be clearly understood by all concerned that the company has neither the right nor the desire to dictate to the dealer the brand or type of merchandise he should handle or the concern from which he should purchase such merchandise or to require him to handle any TBA merchandise. In our opinion there is no valid basis for the issuance of the complaint against us."

Atlantic Issues Statement

A spokesman for Atlantic Refining said, "Starting in the spring of 1951, we have made available to Atlantic dealers for their free acceptance or rejection a TBA sales program with the Firestone and Goodyear companies, which long and intensive research had indicated would yield the greatest profit to the dealers, and best serve the interest of the motoring public. Actual experience has justified our judgment.

"At the time the program was adopted, we considered the arrangement businesslike and proper. We still do. It is disappointing that a plan widely used in industry for almost a quarter of a century should be made the subject of legal attack in 1956."

NORTHERN CALIFORNIA GROUP HEARS ADDRESS BY FISHER

The January 12th meeting of the Northern California Rubber Group held at the Hotel Leamington in Oakland, Calif., heard an interesting address by Dr. Harry L. Fisher, professor of chemical engineering and head of the Department of Rubber Technology at the University of Southern California. In his address, Dr. Fisher stated that by the end of 1956, the United States will be producing 1,300,000 long tons of synthetic rubber of all types.

Dr. Fisher said that in 1956, the United States will also consume 600,000 long tons of natural rubber imported principally from Southeast Asia. The total annual production of natural rubber of approximately 1,800,000 long tons would indicate that the United States will be producing approximately 42% of the total world new rubber supply and consuming about 61% of the total supply.

The speaker observed that the new diisocyanate-polyester rubbers appear to have the most promise of any of the new polymers on the horizon. They show a two- to four-fold improvement in abrasion resistance, compared to the best natural or cold synthetic rubber tread stocks, the speaker declared.

Bonding Presents Problem

In the production of tires from this type of rubber, the principal problem is bonding the diisocyanate rubber to the natural or synthetic rubber carcass stocks. The solution of this problem may be some distance away. Such improved treadwear will be needed for higher speeds to come on freeways and express highways, Dr. Fisher noted.

Another new application for this type of rubber is in the production of cellular foam rubber. This is now in commercial production and shows a higher modulus per unit weight than natural rubber foam cushioning material. Its fire resistance and lighter weight is of interest to the aircraft industry.

Samples of new synthetic polyisoprene rubber were shown. Production techniques using colloidal lithium metal as a catalyst have been developed to produce a near duplicate of natural rubber. This polymer has up to 93-94% of its composition as isoprene, linked together in the same geometrical way as natural rubber coming from the rubber tree. Current indications are that this rubber is equal to natural rubber in low heat build up in large truck and bus tires—known in the industry as low hysteresis load. Tread wear has also been rated as equivalent to the natural product. The potential price of the synthetic at 40 to 45 cents per pound makes this new synthetic a very promising development, Dr. Fisher observed.

Hypalon, a sulfonated chlorinated polyethylene, is a new vulcanizable polymer which will find applications where chemical resistance and good aging are important properties. New brominated Butyl rubber polymers which have similar good properties in chemical resistance and aging properties were also discussed by the speaker.

Coming Events

Feb. 17. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Feb. 21. Elastomer and Plastics Group, Applications of Cellular Synthetic Materials.

Feb. 27 to Mar. 2. American Society for Testing Materials, Committee Week, Hotel Statler, Buffalo, N. Y.

Mar. 15. Elastomer and Plastics Group.

Mar. 16. Boston Rubber Group, Spring Meeting, Hotel Somerset, Boston, Mass.

Mar. 16. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Mar. 23. New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

Apr. 6. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Apr. 12. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Apr. 13. Philadelphia Rubber Group, Poor Richard Club, Phila., Penna.

Apr. 17. Elastomer and Plastics Group.

Apr. 27. Chicago Rubber Group, Furniture Club, Chicago, Ill.

May 15. Elastomer and Plastics Group.

May 16-18. Division of Rubber Chemistry, A.C.S., Hotel Cleveland, Cleveland, Ohio.

May 25. Connecticut Rubber Group.

June 7. New York Rubber Group, Summer Outing, Doerr's Grove Millburn, N. J.

June 15. Akron Rubber Group, Summer Outing.

June 15. Boston Rubber Group, Annual Summer Outing, Andover Country Club, Andover, Mass.

June 17-22. American Society for Testing Materials, 59th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Aug. 2. New York Rubber Group, Golf Tournament, Innis Arden Golf Club, Old Greenwich, Conn.

Aug. 17. Philadelphia Rubber Group, Manufacturers Golf & Country Club, Oreland, Penna.

Sept. 8. Connecticut Rubber Group, Summer Outing.

Sept. 19-21. Division of Rubber Chemistry, A.C.S., Chalfonte-Haddon Hall, Atlantic City, N. J.

Oct. 5. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 26. Philadelphia Rubber Group, Poor Richard Club, Phila., Penna.

PHILADELPHIA ELECTS OFFICERS; HEARS ADDRESS ON AUTOMATION

The Philadelphia Rubber Group held its first 1956 meeting on January 13th at the Poor Richard Club in Philadelphia, Penna. Approximately one hundred and twenty-five members and guests were in attendance. The meeting featured an election of officers for 1956 and a joint talk on "Automation in the Rubber Industry" by Ingram Richardson, president of the Richardson Scale Co. and Walter Young, chief electrical engineer of the same company. The new officers of the Philadelphia Rubber Group are:

Chairman, R. J. Salyerds (Harwick Standard); *Vice-Chairman,* J. R. Mills (Goodall Rubber); *Secretary-Treasurer,* R. Garrett (Armstrong Cork). The group also elected two new directors: T. E. Farrell (Firestone) and R. N. Hendriksen (Phillips).

In their paper on "Automation in the Rubber Industry," Mr. Richardson described a number of automatic weighing installations serving internal mixers which had been made in various rubber plants within the past few years. Slides were shown to illustrate type and arrangement of the equipment and controls. The installations ranged from semi-automatic compounding systems where only a few of the ingredients were handled and weighed automatically to the fully automatic system which had been designed to control 43 items of pelletized rubber, oils, blacks and other compounding materials.

Properly Engienered Materials

Mr. Richardson emphasized the importance of properly engineered materials handling equipment and storage bins to the success of an automatic system. The best possible weighing and control system cannot function as intended if the materials flush or hang up in the bins. Similarly, special attention must be given to the type and design of feeders assigned to handle difficult compounds in a rubber plant.

Mr. Young explained the principles of the various weighing methods and control methods used in automatic weighing and described the operation of a typical electronic weighing system. He also discussed development work that had been done in control instrumentation, adapting the punch card principle to automatic weighing for the rubber industry. An example illustrated a punch card system that controlled the material selection, material routing to and from scale and the material amount for an unlimited number of ingredients. Data reduction instruments, such as calculators, electric typewriters, printers, recorders, etc., and their association with automatic scales was discussed. Reference was also made to the trend towards centralized automatic weighing for material distribution to a bank of Banburys.

The 1956 edition of the Directory of the American Council of Independent Laboratories, Inc., has just been published and is available from the American Council of Independent Laboratories, Inc., 4302 East-West Highway, Washington 14, D. C.

INTERESTING SYMPOSIUM ON FLAME-RESISTANT POLYMERS HELD IN LONDON

Between 300 and 400 persons attended the symposium on "Flame-Resistant Polymers" sponsored by *Rubber and Plastics Age* of London, England, on November 23 and 24 at the National College of Rubber Technology in London. Eight papers on various phases of the subject were presented. On the evening of November 23rd, a dinner was held. The symposium was officially opened by Sir Hugh Linstead, M.P., chairman of the Parliamentary and Scientific Committee. After the first paper had been presented, Sir Hugh had to return to the House of Commons, and the chair was taken over by Dr. Harry Barron, consulting editor of *Rubber and Plastics Age*.

The first paper at the symposium, entitled "PVC and Related Polymers" was prepared by Dr. S. J. Skinner, general sales manager of Geon, Ltd. In the absence of the author, the paper was read by S. E. Bolam of Geon, Ltd. It was stated that the greatest flame resistance was obtained with polyvinylidine chloride which has a higher chlorine content than PVC.

A film on conveyor belt fires was shown. The speaker observed that even though the coefficient of friction of PVC is lower than for rubber, the provision of satisfactory installations was an engineering problem, rather than one of compounding. A member of the audience pointed out that the coefficient of friction of PVC and rubber are actually reversed in the wet state.

Paper on Chlorinated Rubber

"Chlorinated Rubber and Chlorinated Paraffin Wax" was the title of the paper presented at the symposium by H. E. Parker of the General Chemicals Division, Imperial Chemicals Industries. Although the flame resistance of chlorinated rubber has been known for a long time, it was obvious from Mr. Parker's paper that it is used to a much greater extent than is generally realized. The reason for including chlorinated paraffin wax in his paper was that although it is not polymeric in form it is used frequently in conjunction with chlorinated rubber and other polymers. Both substances owe their flame-resistant properties to the large amounts of chlorine.

The two materials are used together in flame-retardant paints and textile proofing. A 60:40 chlorinated rubber/chlorinated paraffin wax compound can give a film with a tensile strength of around 5,000 pounds per square inch. Other flame-resistant plasticizers used are the phosphates and chlorinated diphenyl. Chlorinated paraffin wax is, in fact, a viscous liquid, with about 42% chlorine content, although at 70% it becomes a resinous solid. It can be used to impart flame-resistance to polyester resins amongst others.

Professor M. Stacy of the University of Birmingham, for his part in the symposium, presented a paper on "Prospects for the Application of Organic Fluorine Compounds." The speaker said that the remarkable thermo- and chemically stable properties of polytetrafluoroethylene are a stimulus to the search for other non-inflammable polymeric substances in the fluorocarbon fields.

Methods of fluorination have now reached the stage where a wide range of monomeric materials suitable for polymerization can be obtained. There appears to be no reason, the speaker stated, why fluorine-containing models of most of the well-established man-made polymer should not be made.

Fluorine-containing acrylics are already well-known in the U.S. Polyfluorinated dibasic acids such as perfluoroadipic acid and the corresponding alcohols can now be made quite readily so that polyamide and polyester types can be produced. Phosphate and sulfate esters, fluoroalkyl siloxane derivatives, organometallic derivatives are all now possible. The chemistry leading to some of these types was outlined and suggestions made regarding future technology.

Phosphorous Compounds

F. Tattersall, sales manager of Proban, Ltd., presented the next paper at the symposium, this one entitled "Organic Phosphorous Compounds for Textiles." The author discussed an entirely new method of rendering fabrics flame-resistant, based on hydroxymethyl phosphonium chloride which is now being manufactured in Great Britain by Proban. Mr. Tattersall referred to the high incidence of fatal or serious accidents due to burns in the home, which are caused in the main by ignition of clothing or furnishings.

The lecturer was assisted by Mr. Perfect of Bradford Dyers' Association, who showed some very interesting flame tests on untreated and treated fabrics.

The next paper at the symposium, "Flame-Resistant Rubber" was presented by J. R. Phillips of Dunlop. This paper stated that the popular idea that rubber articles are inflammable is a misconception. It was demonstrated that rubber compounds have been developed which are substantially self-extinguishing and which still retain their characteristic technical qualities. Articles such as fire-proofed flooring, hose, wire covering and packings can be fabricated from suitable rubber compounds containing fire-proofing agents. He stated that although carbon black itself is combustible, tires had been made with natural rubber and up to 26 phr of black which could safely go through a pool of burning gasoline.

Chlorine-Containing Polymers

More recent work involves the addition to rubber of chlorine-containing polymers, such as PVC. Silicone rubbers do not decompose below 400°C. and will withstand temperatures up to 200/330°C. indefinitely.

Mr. Phillips ended by saying that the silicone rubbers in particular, because of their basic structure, opened up new fields of usefulness denied to natural rubber or other synthetics. They are not completely flame-resistant, and will propagate flame, but they will withstand temperatures which will destroy rubber articles whether they are treated with fireproofing agents or not.

H. J. Lanning of Durham Raw Materials, Inc., also presented a paper at the symposium, his being entitled "Flame Resistance of Neoprene and Hypalon." The speaker stated that the biggest use of flame-resistant neoprene has been in the sheeting of trailing cables for mines. He also spoke of the use of neoprene foam mattresses by the U.S. Navy. Mr. Lanning observed that the largest outlet for neoprene latex in the U.S. is for the bonding of hair for upholstery.

In reply to a question from the floor, the speaker stated that there was at present no likelihood of neoprene being manufactured in Great Britain, as there was not at present a big enough market to justify such an installation. He also stated that carbon black could be used quite satisfactorily for flame-resistant neoprene compounds. Hypalon, he said, which is also flame-resistant, has even better heat resistance than neoprene, and is completely ozone-resistant.

"Thermosetting Resins" by C. P. Vale of B.I.P. Chemicals, Ltd., was the next paper presented at the symposium. This paper dealt with the most important types of thermosetting resins and their properties and applications, with particular reference to flame-resistance. In this regard, the speaker discussed melamines, thiourea, nylon, glass-reinforced polyester laminates, silicone resins, etc.

The final paper at the symposium, "PTFE and PTFCE" was presented by Dr. J. Gadsby of the I.C.I. Plastics Division. PTFE and PTFCE were described by the speaker as being probably the most inert commercially-available high polymers, having a very wide working temperature range, excellent electrical properties and are completely non-inflammable.

Cites Specific Applications

He stated that specific applications where flame-resistance is important are: In aircraft, in carrying fuels near to the engines at high temperatures, and hydraulic fluids to the extremes of the aircraft at low temperatures, a PTFE inner tube is reinforced with wire and then given a rubber cover. In event of fire, he stated, such a tube would have a significantly longer life than is usual, and hence prevent immediate explosion of fluids.

At the dinner on the evening of November 23, principal speaker was B.S. Shenstone of British European Airways. Mr. Shenstone discussed the needs of the aircraft operator as to the rubbers and plastics which find use in modern airplanes.

DeLoe Named to New Post

Richard T. DeLoe has been appointed general manager of Malayan American Plantations, Ltd., a subsidiary of the U. S. Rubber Co., New York, N. Y., according to an announcement by Vincent Madsen, managing director of the company's Plantation Division and Far Eastern subsidiaries. Mr. DeLoe will make his headquarters in Penang, Federation of Malaya. He started with U. S. Rubber in 1937 as a junior traveling auditor in the comptroller's department, and his most recent duties included special assignments for the plantation division. Mr. DeLoe is a graduate of the University of Pennsylvania.

Take issue with something in this edition? Write a letter to the editor! (See page 654).

J. H. Day Appoints Schmitt

Ronald W. Schmitt

J. H. Day Co., Inc., Cincinnati, Ohio, a division of the Cleveland Automatic Machine Co., has announced the appointment of Ronald W. Schmitt as sales agent. Mr. Schmitt's territory includes lower Connecticut and eastern New York State, exclusive of New York City. Mr. Schmitt is a graduate of Syracuse University, where he received a bachelor's degree in chemistry and biology. He subsequently attended the Wharton School of Finance at the University of Pennsylvania. Upon graduation, he became a sales representative for the Charles Pfizer Drug and Chemical Co. More recently, he was employed by the Arthur Colton Co. as a sales engineer.

Witco Chemical Names Chovan

Appointment of Daniel J. Chovan as technical sales representative for rubber chemicals of the Witco Chemical Co., New York, N. Y., has been announced by Harry M. Brubaker, vice-president in charge of rubber chemical sales. Mr. Chovan, who will be associated with Witco's Akron laboratory, has been engaged for 19 years in rubber compounding and rubber laboratory research. A member of the American Chemical Society and its Rubber Division, Mr. Chovan was chief chemist of Fawick Flexigrip Co. and technical director of Roth Rubber Co. before joining Witco. He is an alumnus of Kent State University and the University of Akron, where he studied rubber chemistry.

Kohl Retires From Gates

C. N. Kohl, vice-president and comptroller of the Gates Rubber Co., Denver, Colo., since 1941, retired on January 1 after 40 years of service. Mr. Kohl, who joined the company in 1916 as a bookkeeper, has been a member of the Gates Rubber board of management since 1921. He was named comptroller in 1923. A native of Evansville, Ind., Mr. Kohl received his education at the University of Denver School of Commerce. Mr. Kohl is now devoting his time to personal business interests.

Fowles Loaned to BDSA

George A. Fowles, sales manager of plastic materials for the B. F. Goodrich Chemical Co., has accepted an assignment with the U. S. Department of Commerce as director of the Chemical and Rubber Division, Business and Defense Services Administration. Robert F. Dettlebach will handle Mr. Fowles' former duties with Goodrich Chemical for such a time as Mr. Fowles is on loan to the Commerce Department. Mr. Fowles was graduated from the Massachusetts Institute of Technology in 1934. He was first associated with the Anaconda Wire & Cable Co. He left Anaconda to join the consulting firm of Jackson & Moreland, engineers. Prior to World War II, he joined the sales organization of the B. F. Goodrich Co., and in 1945 was appointed sales manager of plastic materials for the B. F. Goodrich Chemical Co. Mr. Fowles is a member of A.I.E.E., S.P.I., S.P.E., the Chemists' Club of New York, etc.

Goodyear Sales Appointments

R. B. Warren has been named to succeed H. D. Foster, sales manager of the Industrial Products Division of the Goodyear Tire & Rubber Co., effective June 1, 1956. Mr. Foster will retire May 31 after 43 years of service with Goodyear. O. A. Schilling, formerly Eastern sales manager for the company's Industrial Products Division, will replace Mr. Warren as manager of Industrial Products Departments on February 20. Mr. Warren will attend the Advanced Management Training program at Harvard University's school of business until May 31. Mr. Warren joined Goodyear in 1927 after being graduated from Ohio Wesleyan University. A veteran salesman, Mr. Foster joined Goodyear in 1913 when the company decided to enter the industrial rubber products field. Mr. Schilling replaced Mr. Foster as Eastern sales manager in 1947. He joined the company in 1939 at Houston.

Expanding Southern Operations

The Firestone Tire and Rubber Co. has announced that production of flotation gear, rubber life rafts, boats and pallet cushions will begin at the company's new $1,110,000 plant in Magnolia, Ark., next January. The firm's rubber boat division, formerly at the Memphis, Tenn., plant has been moved to the new Arkansas plant. The move will not affect Firestone's 3,900 Memphis employes. Much of the flotation gear manufactured at the new plant will go to the armed forces. The company plans to install valuable new equipment at the Arkansas factory within the next five years, with the working force expected to increase from its initial 100 employes to 650. In addition to its Arkansas operation, Firestone is planning a $30,000,000 manufacturing plant which will likely be built in Lake Charles, La., or Orange, Texas. The Lake Charles property includes a 320 acre tract on the Calcasieu River adjoining Firestone's synthetic rubber plant, and another tract of 655 acres, 1½ miles back from the river.

Named to Technical Sales

Laurice W. McCallum

Laurice W. McCallum has been appointed technical sales representative for the J. M. Huber Corp., New York, N. Y. in the southeast. Mr. McCallum will represent the company's Industrial Products Department in its sales of clays, carbon blacks and chemicals to the rubber, paper, ceramics, pesticides and other industries. His headquarters will be in Huber, Georgia. Prior to joining Huber, Mr. McCallum was associated with the Gates Rubber Co. and the B. F. Goodrich Co. in product development, field engineering and sales. He is a graduate chemical engineer of Texas Technical College, Lubbock, Texas.

Reduces Vinyl Resin Prices

A substantial vinyl resin price reduction has been announced by the Bakelite Co., New York, N. Y. "Effective January 9, 1956, Bakelite Co. has reduced vinyl resin prices in a range of from 8.5 to 13 per cent, depending on the type," according to George C. Miller, president. Polyvinyl chloride type resins, of which the Bakelite Co.'s grade designated "VYNW" is typical, are reduced from 31 cents to 27 cents per pound, and the vinyl chloride-acetate copolymer "VYHH" is reduced from 35 cents to 32 cents per pound. VNYW type resins have for many years been the base materials used in compounds for many applications such as wire and cable insulation, calendered film and sheeting for shower curtains, rainwear, inflatable toys and upholstery. The VYHH type has found wire usage in such diverse applications as beer can linings, outdoor paints, sound records, and floor tile. "Many Bakelite Co. vinyl resin compounds will be reduced comparably," Mr. Miller said.

Joins Technical Sales Staff

The appointment of Robert C. Wiese to its Technical Sales Department has been announced by Glyco Products Co., Inc., New York, N. Y. Mr. Wiese has been assigned to the Chicago District Office, 435 North Michigan Avenue. He will assist in covering Northern Illinois, Wisconsin and Minnesota. He was formerly with the Owersey Corp. as plant manager and in technical development. He is a graduate of Illinois Institute of Technology, B.S. Ch. E.

Joins Spencer Products Co.

C. R. Johnson

C. R. Johnson of the Spencer Products Co., Ridgewood, N. J. has announced that his son, Spencer Johnson, joined the company on February 1. Spencer Products is engaged in the manufacture and sale of "Ridacto", an accelerator-activator. For the past 14 years, Spencer Johnson has been with the Research and Development Department of Congoleum-Nairn, Inc. Previously, he was employed in the paint service laboratory of Titanium Pigments Corp., and has done sales work in the chemical field. Spencer Johnson is a graduate of Dartmouth College and of Stevens Institute of Technology in chemical engineering. He holds membership in the American Chemical Society, the New York Rubber Group and the Society of Plastics Engineers. He will devote most of his time toward the development of new products for the rubber and related industries.

To Make Polyethylene in Brazil

W. R. Grace & Co., and Germany's Farbwerke-Hoechst A. G. of Frankfurt are going to have their jointly-owned Brazilian company produce a new type of polyethylene developed by the German company. Boards of directors of both companies have announced their approval of the plan, which involves the construction of a new plant in the South American country. A spokesman for Grace said it has not yet been determined whether this plant would be an adjunct to the jointly owned facility now producing insecticides in Brazil or whether a new site would be required. The new type of polyethylene, made by a low pressure process, is said to be almost odorless and tasteless. It is said to have wide application as an insulating material for wire and cable and for household articles and toys. The plant would serve the Brazilian market, it was stated. The companies did not reveal how much the plant would cost, what its capacity would be or how soon construction was likely to begin. In this country, Grace is licensed to produce low-pressure polyethlene by a process developed by Phillips Petroleum Co.

Multiwall Bag For Synthetic

St. Regis Paper Co., New York, N. Y., has announced the development of a new multiwall bag for the packaging of synthetic rubber. This new bag, developed in cooperation with the major synthetic rubber manufacturers, is a three-ply, pasted multiwall bag with square ends, described as a "box-end bag." Synthetic rubber provides a difficult packaging problem since it is sticky and flows in the same manner as rubber cement. Initially, synthetic rubber was packaged in corrugated containers. Subsequently, a regular sewn multiwall bag with a clay-coated inner ply was developed by St. Regis for packaging synthetic rubber. This multiwall bag provided an improved package at lower cost for synthetic rubber as well as a number of other important advantages. These included the use of fewer freight cars since many more bags could be shipped in each car. However, the difficulty with this first package was that the rubber stuck in the corners of the sewn bags, and it was an expensive and time-consuming operation to reclaim this rubber. Also, the release coatings were not always applied evenly with the result that the rubber was able to penetrate the coatings and adhere to the paper. Since synthetic rubber must be absolutely pure when converted into other products, the possible contamination by bits of paper presented a serious problem.

About three years ago, St. Regis made a survey of the packaging of synthetic rubber and, based upon the results of this survey, began work on the development of a multiwall bag designed especially for the packaging of synthetic rubber. The three-ply, pasted multiwall bag with square ends is available in two forms: coated with a new double-weight clay release medium for packaging talc-covered bales of synthetic rubber, and uncoated for packaging plastic-wrapped bales. The success of this new development is demonstrated by the fact that there were no problems with adhesion, break-through or contamination of rubber stored for seven months in the new multiwall bag. Equally important in the development is the fact that the new bag can be sealed automatically through the use of a bale closing machine which can handle the production of four rubber manufacting lines.

Karr Named Chief Engineer

Winnard E. (Jack) Karr has been named chief engineer of the Fawick Airflex Division, Fawick Corp., Cleveland, Ohio, manufacturer of heavy-duty clutches and brakes. He will be in charge of the development and application of Fawick pneumatic type clutches, power transmission units and high-speed clutch controls. After attending the University of Cincinnati, Mr. Karr joined the International Harvester Company and served in various engineering capacities including field service in the Research Department, Hydraulic Division. From 1946 until joining Fawick, he was connected with Beloit Iron Works, Wisc., as division engineer in the design and application of hydraulic, mechanical and electrical drive units.

Velsicol Promotes Lukas

Edward B. Lukas

Promotion of Edward B. Lukas to the position of technical service representative for the Velsicol Chemical Corp., Chicago, Ill., has been announced by John F. Kirk, vice-president and director of sales. Mr. Lukas joined Velsicol in 1948, and comes to his new post from the Velsicol Resin Laboratories. He has been active in development and application research on the hydrocarbon resins and solvents that Velsicol's Industrial Division supplies to the rubber, paint, textile, and allied industries, and, in his new position he will furnish special technical services to Velsicol's customers and sales representatives. Working under the direction of Industrial Division sales manager, Andrew Schor, Mr. Lukas will headquarter at Velsicol's general offices and laboratories in Chicago, and maintain close liaison with Velsicol plants in Memphis, Tenn. and Marshall, Ill.

Clark Joins Houdry Process

John Robert Clark, Jr., has joined the sales organization of the Chemicals Division of Houdry Process Corp., Philadelphia, Penna. Mr. Clark has previously been with the Washington Brick Co., at Muirkirk, Md., first as plant engineer and assistant to the president, and as plant manager just prior to joining Houdry. He completed his education at the Massachusetts Institute of Technology, Cambridge, Mass., with a B.S. in business and engineering administration, after having majored in chemistry for three years at George Washington University.

Titanium Dioxide Available

Farber Products Co., Inc., 226 Lafayette St., New York 12, N. Y., has announced the availability of large quantities of titanium dioxide in both the anatase and rutile grades. The principals of the Farber Products Co. have been associated with the chemical industry for over twenty years. The company will welcome inquiries about titanium dioxide or other hard to obtain chemicals.

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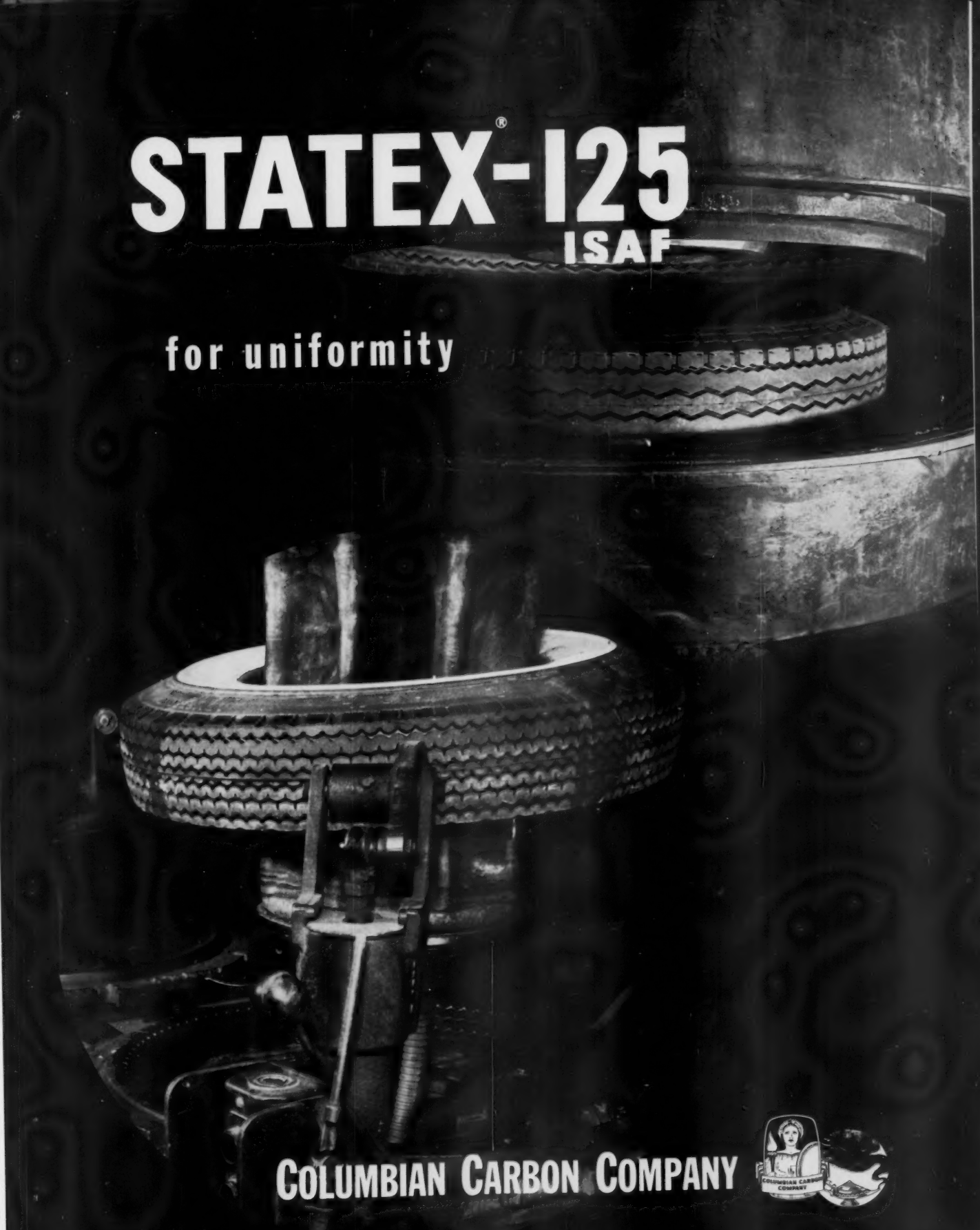

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ANNUAL TECHNICAL MEETING HELD BY SPE IN CLEVELAND

The Society of Plastics Engineers, Inc., held its 12th Annual Technical Conference on January 18 through 20 at the Hotel Statler in Cleveland, Ohio. Of particular interest were two symposiums which were held, one on "Calendering and Coating" and the other on "Plastic Foams." J. Leavy (DuPont) served as moderator at the first of these two sessions at which four papers were presented.

The first paper presented at the session on "Calendering and Coating" was entitled "Calendering Equipment." It was prepared by R. C. Seanor (Adamson United). This paper contained a history of calendering techniques and problems, describing present-day advancements in precision rolls, journals, bearings, temperature controls, etc. Also discussed were speed of production and control mechanisms for assuring constant film thickness.

The second paper presented at the session, as prepared by E. F. Wuest (Masland Duraleather) was entitled "Calendering Techniques." Mr. Wuest's paper took his audience step-by-step through all processes involved in the calendering of vinyl sheeting from the raw material to finished sheeting. Banbury mixing, milling and calendering were described in detail.

Fabric Coating Techniques

"Coating Equipment" was the subject of the next paper presented at the symposium. The author, Dale G. Higgins (John Waldron), through the use of slides, discussed spread coating techniques. He outlined those processes in use today and the derivation of new techniques borrowed from paper coating technology.

The final paper at the symposium, by E. G. Hamway (Textileather) concerned itself with "Fabric Coating Techniques." Mr. Hamway's paper included a general discussion of present-day materials and techniques used in the manufacture of plastics coated fabrics. Future possibilities were summarized and factors governing growth set forth.

E. J. Baruth (Brown Rubber) served as moderator at the symposium on "Plastic Foams." This symposium also featured four papers, the first of which "Chemically Blown Foam" was presented by H. E. Arnold (DuPont). In his paper, Mr. Arnold discussed a non-discoloring, non-staining vitrogen releasing blowing agent which was designed to produce both closed and open cell types of PVC foam. Particular attention was paid to formulation and processing.

The next paper at the symposium, by C. J. Harrington (DuPont) was on the subject of "Isocyanate Foams." This paper featured a technical presentation of rigid insulating and resilient cushioning polyurethane foams showing their present and future applications and properties.

H. F. Allen (Elastomer) presented another paper at the symposium, this one on "Gas Injection Vinyl Foam." The author outlined the growth, present status and future potentials of the vinyl foam industry. Specifically, he pointed out techniques, the "Elastomer Process," applications, materials, etc.

"Foamed-In-Place Polystyrene" was the title of the paper presented by G. R. Franson (Dow Chemical) at the session on "Plastic Foams." His paper included a discussion of the types of polymer employed, formulations, expanding agents, fabrication techniques, molding, heating and cooling, mold construction and molding cycles.

Offers Research Formula

Reasonable amounts for research and developments costs can be approximated through the use of this formula proposed by Ralph H. Manley of the Research Department of General Mills, Inc.:

$$R \leqq \frac{(YSN\text{-}P\text{-}W)}{r}$$

Here, R is research and development cost before taxes; r, the fraction of this cost that is not tax-deductible; Y, the recoupment period; S, the annual net sales volume; and N, the minimum net profit after taxes, as a percentage of sales.

Appointed to New Posts

John W. Pozerycki has been appointed Plant Manager of the International Packings Corp. in charge of all production at their Bristol, N. H. plant. John W. Reedy has been named quality manager responsible for all quality control and inspection at the plant. Mr. Prozerycki was formerly retained as consulting engineer to this firm. He was works manager for the Needham Manufacturing Co. from 1948 to 1954 and, prior to that, was a partner in a management consulting firm. He studied at Harvard and M.I.T. and is a member of the Society of Automotive Engineers and the Society for the Advancement of Management. Mr. Reedy was formerly development engineer with the Garlock Packing Co. and, prior to that, was chief chemist of the New York Rubber Corp. He holds a B.S. in chemistry from Lafayette College and is a member of the American Chemical Society.

Wellco-Ro-Search Expanding

H. W. Rollman, president of the Wellco-Ro-Search organization, Waynesville, N.C., has announced that it has become necessary to provide additional space and facilities at the machine building plant in Waynesville. Plans are being formulated to double present capacity to meet demand from the Wellco Shoe Corp. and from Ro-Search affiliates on five continents. Mr. Rollman noted that up to about two years ago it was impossible for foreign affiliates to receive the necessary permits from their governments to purchase equipment against dollar payment in the United States. This situation has now been eased. Wellco-Ro-Search is also planning an expansion of its Mold Making Department in Waynesville.

AKRON HOLDS SYMPOSIUM ON RUBBER IN TRANSPORTATION

The January 27th meeting of the Akron Rubber Group, held at the Sheraton-Mayflower Hotel in Akron, Ohio, featured a symposium on "Rubber Meets the Challenge of Modern Transportation." J. J. D'Ianni (Goodyear) served as moderator. Two of the panel members, in their papers, laid the groundwork for the discussion by other panel members, by outlining the needs of the transportation field. W. J. Simpson (Chrysler) offered a paper on "Future Rubber Requirements of the Automobile Industry," and E. R. Bartholomew (Wright Patterson Air Force Base) discussed "Specifications for Rubber Parts of the Aircraft of Tomorrow."

The other members of the panel answered questions raised in the first two papers. J. J. Allen (Firestone) discussed "Natural Rubber and GR-S"; B. M. G. Zwicker (Goodrich) offered a paper on "Nitrile Rubber"; H. C. Evans (Enjay) spoke on "Butyl Rubber," and R. Malcomson (DuPont) discussed "Neoprene and Hypalon." In addition, panel members also discussed such specialty rubbers as silicone, Kel-F, polyacrylic, isocyanate, etc.

Long-Lasting Tire Treads

At the meeting it was stated that tire treads that last twice as long in any service today are a distinct possibility within a few years. It was felt that these new treads will probably be made of polyurethane rubbers. While extensive tests of tires made from this material are now going on, the big problem is how to get the new rubber to adhere to the carcass. It was reported that progress is being made in solving this problem.

It was noted that current tires are adequate under today's driving conditions where legal speed limits exist and are reasonably enforced. Where speed limits are not observed and range to 95 miles an hour or above, nylon tires are required.

It was stated that wire cord for truck tires apparently has been inferior to nylon for rough service. Wire tires are also more easily damaged by under-inflation. It was also noted that with the discovery of natural-like synthetic rubbers, defense planners can now relax a bit.

Expanding Synthetic Facilities

Phillips Chemical Co. has announced plans to build a new synthetic rubber plant near Borger, Texas, which will increase its capacity by 30,000 long tons annually. Capacity of an adjacent butadiene plant will be increased by 24,000 tons. Company officials stated that increased demand for "Philprene" necessitated the new construction program. The new facilities will be the third expansion announced by the company in recent months. A 15% increase in capacity is scheduled by mid-1956; a second increase of 22% is scheduled for early 1957, while this latest project is scheduled for completion by mid-1957. When all projected expansions are completed, the company will have an annual capacity of 108,000 long tons of synthetic rubber.

Cabflex HS-10 Plasticizer

The Plastics Chemicals Division of Godfrey L. Cabot, Inc., Boston, Mass., has announced the commercial availability of "Cabflex HS-10" said to be the first low volatility phthalate plasticizer to offer excellent processing characteristics. Cabflex HS-10, an alkyl aryl phthalate developed by the Cabot Research & Development Laboratories, has a lower volatility—one-half that of di-decyl phthalate—than any other available phthalate plasticizer, the firm states. By virtue of this new Cabot development, in Cabflex HS-10 low volatility has been combined with the same processing characteristics and vinyl resin compatibility found in DOP.

Cabflex HS-10 has been specifically developed to fill a definite need for a monomeric plasticizer having high stability and permanence, suitable for use in applications where products are subjected to above normal atmospheric conditions. It requires no antioxidant, has electrical properties superior to DOP, and long-term aging tests in an air circulating oven at high temperatures have demonstrated its resistance to oxidation and heat breakdown. Cabflex HS-10 has outstanding insulation resistance in electrical viny compounds—13,000 megohms/1000 ft. @ 15.6°C—and shows excellent resistance to extraction by gasoline, oil and water. It has a low rate of migration and greatly improves processing characteristics while maintaining the permanence of plasticizer systems in blends with polymeric plasticizers. Cabflex HS-10 is compatible with cellulose acetate butyrate, cellulose nitrate, ethyl cellulose, polymethyl methacrylate, polystyrene, etc.

New Dayton Truck Tire

A new truck tire said to offer surer traction and resistance to cuts, cracks and chips has been introduced by Dayton Rubber Co., Dayton, Ohio. Called the "Dayton Thorobred D. S. Traction Tire," it is designed to meet the demands of stop-and-go operations in city or country, according to Irve Eisbrouch, vice-president in charge of tire sales. It boasts a specially compounded tread designed to put more rubber on the road for superior gripping in all directions. One third more rubber in the under-tread makes a tougher body and permits additional recaps. Mr. Eisbrouch said other innovations include "wiper action" tread, self-cleaning traction lugs, electronically-processed cord body for extra blowout protection and maximum resistance to scuffing and wear.

Reclaimers Elect 1956 Officers

Chester H. Peterson, president of the U. S. Rubber Reclaiming Co., Buffalo, N. Y., was elected president of the Rubber Reclaimers Association, Inc., at the Association's January 24 Annual Meeting. Henry L. Dixon, general manager of the Industrial Products Division of the B. F. Goodrich Co., Akron, Ohio, was elected vice-president, while Charles T. Jansen, RUBBER AGE, was re-elected secretary-treasurer. Gilbert K. Trimble, president of the Midwest Rubber Reclaiming Co., East St. Louis, Ill., was appointed chairman of the Association's Executive Committee.

Escambia Building PVC Plant

Escambia Bay Chemical Corp., Cambridge, Mass., has awarded a contract to the Blaw-Knox Co. for the construction of a polyvinyl chloride resin plant near Pensacola, Fla. The new multi-million dollar facility will have a capacity of 30,000,000 pounds per year. It marks Escambia's initial entry into the resin business. Escambia (which is owned by United Gas Corp., Electric Bond and Share Co., and National Research Corp.) is now nearing completion of a $23 million installation to produce ammonia and other nitrogen compounds near Pensacola. The new plant will provide a complete line of suspension-type easy-processing PVC resins for electrical, sheeting, extrusion, and film uses. Production of Escambia's PVC resins will be under the supervision of Joseph Gafford, formerly with Goodrich Chemical. Sales Manager for Escambia's plastics is Walter W. Peacock, Jr., formerly with the Naugatuck Chemical Div. of U. S. Rubber.

DuPont Technical Bulletins

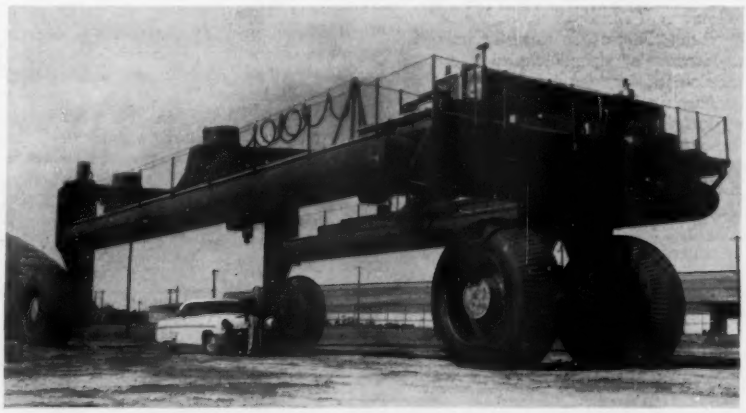
Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has announced the publication of a number of technical bulletins. Report BL-303 deals with "Low Modulus Neoprene Compounds." Report BL-304 covers "Low Cost General Purpose Hose Tube Compounds." Report BL-305 is on the subject of "Chlorination of Elastomeric Products," and Report BL-306 discusses "Hot Materials Belts Made with Hypalon 20." Copies of the reports are available from the company.

RS Polymer Descriptions

At its meeting on December 15, 1955, in Akron, Ohio, Section VII (Code Number Section) of Subcommittee XIII on Synthetic Elastomers, Committee D-11 on Rubber and Rubberlike Materials, American Society for Testing Materials, recommended that the parent society establish types of synthetic rubber according to the table shown on the opposite page. It was noted that all companies are already furnishing a certified table of the physical properties of the shipment as compared to the standard bale. It will be seen that the numbers in the table follow the original numbers set up by Rubber Reserve. It was also decided to recommend to each company that in the interest of a system that would provide the least amount of confusion for non-captive purchasing departments, numbers be used for non-conforming RS and RB (polybutadiene) rubbers according to the listing which is shown below. Each company could block off a series within their master group for certain types if they wished. Suggested producers' code numbers follow:

American Synthetic	3000 to 3499
Copolymer	3500 to 3999
Firestone	4000 to 4499
Goodrich-Gulf	4500 to 4999
Goodyear	5000 to 5499
Institute	5500 to 5999
Naugatuck	6000 to 6499
Phillips	6500 to 6999
Polymer Ltd.	7000 to 7499
Shell	7500 to 7999
Texas-U. S.	8000 to 8499
United	8500 to 8999
General	9000 to 9499

LETOURNEAU ARMY RETRIEVER TRAVELS ON WORLD'S LARGEST TIRES



Developed for the U. S. Army Transportation Corps, a new transportation unit produced by R. G. LeTourneau, Inc., Longview, Texas, is designed to retrieve stranded landing craft during amphibious military operations. The "Landing Craft Retriever," electrically self-propelled and traveling on four of the largest rubber tires in the world, is a highly intricate arrangement of hoists, wheels and engineered power which enables it to straddle a 67-ton vessel and literally lift it from the water. The unit can right a capsized or stranded craft, transport it to deeper water, or carry it bodily out of the water and up onto the shore. The unit weighs 101 tons, is 75 feet long, 38 feet wide and 22 feet high. A system of simple electric switches makes it possible for one man to operate all functions of the unit, although a crew is maintained for attaching hoist cables to the grounded or stranded craft. Each wheel is equipped with tubeless tires 10 feet high and four feet high, allowing flotation and traction in extremely soft terrain.

Descriptions of RS Synthetic Rubber Polymers as Recommended by ASTM Subcommittee

Type	Nominal Temp. °F.	Activator	Shortstop	Antioxidant	Catalyst	Emulsifier	Nominal Bound Styrene %	Nominal Conversion %	Nominal Mooney ML-4	Coagulation	Carbon Black Type	Carbon Black %	Oil Type	Oil Parts	Finishing
1000	122	—	ST	ST	P	FA	23.5	68	48	SA	—	—	—	—	Normal
1001	122	—	ST	SL ST	P	FA	23.5	68	48	SA	—	—	—	—	Normal
1004	122	—	ST	ST	P	FA	23.5	72	50	Alum	—	—	—	—	Normal
1006	122	—	NON ST	N ST	P	FA	23.5	72	50	SA	—	—	—	—	Normal
1007	122	—	ST	ST	P	FA	23.5	72	50	GA	—	—	—	—	Normal
1009*	127	—	ST	N ST	P	FA	23.5*	77	125 Cpd	SA	—	—	—	—	Normal
1010	122	—	ST	N ST	P	FA	23.5	72	30	Alum	—	—	—	—	Normal
1012	122	—	ST	N ST	P	FA	23.5	72	105	SA	—	—	—	—	Normal
1013	122	—	ST	N ST	P	FA	43.0	77	45	Alum	—	—	—	—	Normal
1014	150	—	—	SL ST	P	RA	43.0	80+	70	BR-AL	—	—	—	—	Normal
1015	125	—	ST	ST	P	RA	3.5	72	55	SA	—	—	—	—	Normal
1016	122	—	ST	ST	P	FA	23.5	72	50	GA	—	—	—	—	SP
1018*	127	—	ST	N ST	P	FA	23.5*	77	125 Cpd	GA	—	—	—	—	SP
1019	122	—	ST	N ST	P	FA	23.5	72	50	GA	—	—	—	—	SP
1020*	127	—	ST	N ST	P	FA	23.5*	77	80 Cpd	GA	—	—	—	—	SP
1021	125	—	ST	ST	P	FA	45.0	86	85	AC-AL	—	—	—	—	SP
1022	125	—	ST	N ST	P	RA	23.5	72	80	GA	—	—	—	—	SP
1023	122	—	ST	ST	P	FA	13.0	72	50	GA	—	—	—	—	SP
1100	122	—	ST	ST	P	FA	23.5	68	50 Cpd	SA	EPC	33.3	—	—	Normal
1103	122	—	ST	ST	P	FA	23.5	72	48 Cpd	SA	MAF	33.3	—	—	Normal
1104	122	—	ST	SL ST	P	FA	23.5	72	48 Cpd	SA	MAF	33.3	—	—	Normal
1500	43	FRA	Carbamate	ST	OHP	RA	23.5	60	52	SA	—	—	—	—	Normal
1501	43	FRA	Carbamate	SL ST	OHP	RA	23.5	60	52	SA	—	—	—	—	Normal
1502	43	FRA	Carbamate	N ST	OHP	Mixed	23.5	60	52	SA	—	—	—	—	Normal
1503	43	FRA	Carbamate	N ST	OHP	FA	23.5	60	52	GA	—	—	—	—	SP
1504	43	FRA	Carbamate	N ST	OHP	FA	12.0	60	52	GA	—	—	—	—	SP
1505	43	FRA	Carbamate	ST	OHP	RA	9.0	60	40	SA	—	—	—	—	Normal
1600	43	FRA	Carbamate	ST	OHP	RA	23.5	60	72 Cpd	SA	HAF	33.3	—	—	Normal
1601	43	FRA	Carbamate	ST	OHP	Mixed	23.5	60	68 Cpd	SA	HAF	33.3	—	—	Normal
1602	43	FRA	Carbamate	ST	OHP	Mixed	23.5	60	85 Cpd	SA	HAF	33.3	—	—	Normal
1703	43	Free Radical Type	Carbamate	N ST	Organic Hydroperoxide	Mixed	23.5	60	60	SA	—	—	NAPH	25	Normal
1704	43	Free Radical Type	Carbamate	N ST	"	RA	23.5	60	60	SA	—	—	NAPH	25	Normal
1705	43	Free Radical Type	Carbamate	ST	"	Mixed	23.5	60	60	SA	—	—	AR	25	Normal
1706	43	Free Radical Type	Carbamate	ST	"	Mixed	23.5	60	60	SA	—	—	HI-AR	25	Normal
1707	43	Free Radical Type	Carbamate	N ST	"	RA	23.5	60	55	SA	—	—	NAPH	37.5	Normal
1708	43	Free Radical Type	Carbamate	N ST	"	FA	23.5	60	60	GA	—	—	NAPH	37.5	Normal
1709	43	Free Radical Type	Carbamate	ST	"	RA	23.5	60	55	SA	—	—	AR	37.5	Normal
1710	43	Free Radical Type	Carbamate	ST	"	Mixed	23.5	60	55	SA	—	—	AR	37.5	Normal
1711	43	Free Radical Type	Carbamate	ST	"	RA	23.5	60	55	SA	—	—	HI-AR	37.5	Normal
1712	43	Free Radical Type	Carbamate	ST	"	Mixed	23.5	60	55	SA	—	—	HI-AR	37.5	Normal
1801	43	Free Radical Type	Carbamate	ST	"	Mixed	23.5	60	65 Cpd	SA	HAF	28.5	NAPH	25	Normal

* These polymers contain a cross-linking agent.

DESCRIPTION OF ABBREVIATIONS

FRA—Free Radical Type (i.e., iron, pyrophosphate, peroxamine, sulfoxylate; ST—Staining; N ST—Non-Staining; SL ST—Slightly Staining; FA—Fatty Acid; RA—Rosin Acid; OHP—Organic Hydro Peroxide; SA—Salt Acid; GA—Glue Acid; BR-AL—Brine-Alum; AC-AL—Acid Alum; SP—Special Finishing; HI-AR—Highly Aromatic; AR—Aromatic; NAPH—Naphthenic; P—Persulfate.

DETROIT GROUP ANNOUNCES RUBBER TECHNOLOGY COURSES

The Detroit Rubber and Plastics Group in cooperation with Wayne University, has announced a tentative program for the Spring semester courses in rubber technology. The courses offer a study of the fundamental properties of natural and synthetic rubbers with emphasis on their effects on compounding, processing and application. Course I is designed for beginning compounders, sales personnel, purchasing agents, etc. Course II is designed for everyday compounders and other rubber technologists.

Course I began on February 10 and Course II on February 9 with each course continuing on a weekly schedule thereafter. Each course costs $30. All lectures are held at Wayne University in Detroit, Mich. The instructor for Course I is S. R. Schaffer of the U. S. Rubber Co. Instructor for Course II is C. H. Albers of the Baldwin Rubber Co. There follows below a tentative outline of each course, week by week, as prepared by the Detroit Rubber and Plastics Group:

Rubber Technology I

First Week: Natural Rubber—sources, types, grades and characteristics. Motion picture of Firestone's Liberian plantation.

Second Week: Synthetic Rubber—history of synthetic rubber development. Motion picture on GR-S manufacture from U. S. Rubber Co. Current states of GR-S: low temperature GR-S; black masterbatch GR-S; oil extended GR-S.

Third Week: Reclaimed Rubber—alkali, acid, and neutral types. Motion picture of Midwest Rubber Reclaiming Co. process. Properties and uses of reclaim.

Fourth Week: General review of chemistry.

Fifth Week: Introduction to Compounding—classification of compounding ingredients: characteristics and function of vulcanizing agents, accelerators, activators, antioxidants, softeners, reinforcing and non-reinforcing fillers.

Sixth Week: Physical Testing—classes of physical tests and significance. Testing equipment.

Seventh Week: Visit to Wyandotte Chemical Rubber Research and Service Laboratory.

Eighth Week: Processing—plastication; mill and Banbury breakdown and mixing, Ford Tire Plant film.

Ninth Week: Plant Tour—Baldwin Rubber or U. S. Rubber demonstration of large scale processing.

Tenth Week: Processing—extrusion and calendering.

Eleventh Week: Vulcanization—terminology of vulcanization rate and degree of cure. Establishing practical cure cycles.

Twelfth Week: Polyurethanes—classes, properties and uses.

Thirteenth Week: Nitrile and Butyl rubbers.

Fourteenth Week: Latex Technology—advantages and limitations of latex vs. dry rubber processes. Latex compounding and processing. Latex foam.

Fan Belts Getting Thinner

Like men's belts, automobile fan belts have gotten thinner in recent years. Old-style fan belts used up to about 1950 were from 5/8 of an inch to one-inch in width. Today, most of the new cars are using fan belts only 3/8 of an inch thick, according to engineers of the Dayton Rubber Co. These narrower belts run quieter and cooler. They also last longer because they more efficiently utilize the material of which they are made. Stronger rayon cords and a new operating principle make these slimmer belts possible.

Fifteenth Week: Adhesives — rubber adhesives as construction materials. Classes and test methods.

Sixteenth Week: Silicone rubber. Review.

Rubber Technology II

First and Second Week: Processing Equipment—a general discussion of the available types of processing equipment (bale cutters, mills, internal mixers, calenders, extruders, vulcanization equipment, and finishing machinery). A portion of the first week will be used for registration and discussion of course objectives and scope.

Third Week: A Comparison of Elastomers—short background in history of natural rubber and synthetic elastomers. Major discussion on chemical structure of various elastomers especially as it relates to processing characteristics and vulcanizate properties.

Fourth Week: Vulcanization and Acceleration in Theory and Practice—the chemistry of the vulcanization reaction. Chemical classification of accelerators related to accelerator properties. Typical vulcanization systems for various elastomers.

Fifth Week: Antioxidants and Other Compounding Ingredients—the role of antioxidants in protecting against oxygen, ozone, heat and flexing. Types of antioxidants by chemical class and by function. Discussion of peptizing agents, tackifiers, extenders, waxes, etc.

Sixth Week: Carbon Blacks—the available types of carbon black. Factors which affect the selection of a carbon black (particle size, PH, structure). The practical aspects of the carbon gel complex.

Seventh Week: Non-Black Fillers—Types of non-black fillers. Detailed discussion of the two major types (clays and calcium carbonates). Effects of particle size and shape. Some comparisons with carbon black.

Eighth Week: Natural Rubber and GR-S—a detailed study of practical compounding and processing. Types and grades available. Comparisons of vulcanization and acceleration. Relative needs for reinforcement, etc.

Ninth Week: Butyl and Reclaimed Rubber—contrasting nature of Butyl with respect to processing and vulcanization. Problems resulting from low unsaturation. The role of reclaim in the rubber industry. Its effects on processing, cure and vulcanizate properties.

Tenth Week: Neoprene—a comparison of the various general purpose and specialty neoprenes. Detailed discussion of sulfur-modified and non-sulfur-modified types with respect to compounding with processing. Compounding for specific properties.

Eleventh Week: Nitrile Rubbers—a comparison of the available types. The effect of acrylonitrile content on processing and vulcanizate properties. Typical vulcanization systems. Compounding the specific properties.

Twelfth Week: Latex and Solvent Systems—the colloidal nature of latex. Practical problems of compounding and processing latices. Polymer properties as revealed in solvent systems. Effects of solvents on cement stability, viscosity and drying rate. Basic principles of solution compounding.

Thirteenth Week: Plastics in the Rubber Plant—practical application of vinyl resins and rubber/resin blends. Phenolics, styrene/butadiene resins and styrene/acrylonitrile resins in rubber reinforcement.

Fourteenth Week: Analyzing Compounding Problems—a review of information required to attack the problem. Compounding to specifications. Cost calculation. Selection of processing equipment.

Fifteenth Week: Practical Compounding Problems—a series of practical exercises in applying basic principles.

Sixteenth Week: Can be used as a review session, or if preferred, can be used for a plant trip to U. S. Rubber or Baldwin Rubber. This will be determined by class preference.

Appointed Production Manager

Alvin L. McMullen, formerly production superintendent of the Seiberling Rubber Co., Akron, Ohio, has been named to the newly-created post of manager of production. Also announced was the promotion of Edwin P. Schrank, former chief staff engineer, to the position of manager of engineering. Messrs. McMullen and Schrank will assume duties left vacant by the resignation of John E. Kallgren, plant manager. Irvin R. Heller, project engineer, has been appointed chief staff engineer, filling the position formerly held by Mr. Schrank. Mr. McMullen, a 1939 graduate of the University of Akron with a B.S. degree in chemistry, joined Seiberling shortly thereafter. He will be responsible for all manufacturing operations in the company's Barberton and Carey, Ohio, plants. Mr. Schrank joined Seiberling as a staff engineer in 1947 after receiving his bachelor's degree in mechanical engineering from Cornell University. He will be responsible for all company-wide engineering operations. Mr. Heller started with Seiberling in the Tire Design Section in 1947.

Have some comments to make? Write a letter to the editor! (See page 654).

Named Sales Representative

Frank J. Milo

Rhodia, Inc., New York, N.Y., has appointed Frank J. Milo as sales representative, specializing in the sale of aromatic and industrial (Alamask) odor control chemicals. An alumnus of the College of the City of New York and the College of Pharmacy of Columbia University, Mr. Milo served in SHAEF Headquarters, European Theatre of Operations, during World War II. Upon his return in 1946, he became associated with Givaudan-Delawanna, Inc. in technical sales. In 1948, upon the formation of the Sindar Corp., Division of Givaudan, Mr. Milo was appointed assistant to the sales manager and handled all industrial aromatic chemicals and compounds. He spent five years in calls on potential customers and in development work; as well as actual liaison work between the various laboratories. From September, 1953, until he joined Rhodia, Mr. Milo was associated with Corona Mills, Lawrence, Mass.

To Make Gas Inflated Balls

Fli-Back Co., Inc., High Point, N. C., has purchased from the Auburn Rubber Co., Auburn, Ind., all rights to original molds, patterns, drawings, designs, etc., for decorating a complete line of rubber gas inflated balls formerly made by Auburn Rubber. Fli-Back is now producing gas inflated balls in sizes from 2¼ to 6 inches in diameter in decorated colors and figures. The company will also produce four sizes of toy footballs and basketballs. Samples of the new line will be shown at the annual Toy Fair which will be held during March at the Hotel New Yorker in New York City.

Mitchell Rubber of Texas Formed

A new firm, Mitchell Rubber of Texas, has begun operations in a recently constructed building at 1402 Slocum in Dallas, Texas, according to John J. Schafhausen, owner. The new company is affiliated with the Mitchell Rubber Co., Los Angeles, Calif. Mitchell Rubber will produce and market mats and matting throughout the Southwest.

FINANCIAL BRIEFS

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., has acquired 2,164 common shares through stock option and made gifts of 1,301, making direct holdings 47,567. E. J. Thomas, president, acquired 1,948 common shares through stock option, increasing direct ownership to 30,750.

J. W. Crosby, president of the Thiokol Chemical Corp., has acquired 1,658 common shares through stock option, increasing direct holdings to 3,796.

Burlington Industries, Inc., owner of more than 10% of equity securities in Goodall-Sanford, Inc., has purchased 1,650 common shares, making direct holdings of 582,184.

The Walter and Edna Ritter Foundation has received 1,500 common shares in the Detroit Gasket and Manufacturing Co. as a gift, making direct holdings that amount.

Hal A. Kroger, director of the Rome Cable Corp., has bought 700 common shares, increasing his direct holdings to 1,800.

Interchemical Corp., on January 3, declared a 15% stock dividend on its outstanding common shares and a 65c cash dividend on both the stock dividend shares and those now outstanding.

H. O. Canfield Appoints Two

The appointment of Joseph R. Calistro as supervisor of the engineering department and Paul I. Hastings as chief chemist of the H. O. Canfield Co., Bridgeport, Conn., has been announced by Ralph M. Wyman, vice-president. Mr. Calistro is the former quality control manager of the Connecticut Hard Rubber Co. and holds a B. S. degree from the University of Connecticut in mechanical engineering. He is a veteran of World War II, and a member of the Connecticut Rubber Group and the American Society of Mechanical Engineers. Mr. Hastings, the new assistant technical director of H. O. Canfield, is a former executive of the Firestone Industrial Products Co. of Fall River, Mass., and holds a B. S. degree in chemistry from Boston College. He is a member of the Rhode Island Rubber Group, Boston Rubber Group, Connecticut Rubber Group, New York Rubber Group and American Chemical Society.

Heads Harris Products Co.

Matthew J. Fleming, Jr., has been appointed president of the Harris Products Co., Cleveland, Ohio, a subsidiary of the Clevite Corp. Mr. Fleming was formerly assistant to the president of the Clevite Corp. He succeeds Newton D. Baker, III, who has resigned.

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Borland Named Vice-President

Joseph V. Borland

Joseph V. Borland, associated with the Watson-Standard Co., Pittsburgh, Penna., since 1934, has been appointed a vice-president of the company. Mr. Borland is an alumnus of the University of Rochester. Upon completion of his military service in World War I, he joined the Koppers Co. as an operations engineer in the United States and foreign countries. Since his association with Watson-Standard, he has been active in the Technical Sales Division, specializing in lithographic surface finishes.

Hooker Electrochemical Changes

Three changes in responsibilities have been announced at the Hooker Electrochemical Co., Niagara Falls, N. Y. John F. Snyder, Sr., director and vice-president, has assumed wider responsibilities in over-all company management. Dr. Jay C. Searer and Lothar A. Sontag have been promoted to production manager and technical manager, respectively, of Hooker's Durez Plastics Division. Mr. Snyder has been primarily concerned with guiding activities of the Durez Plastic's Division. He now joins the administrative group in Hooker's headquarters at Niagara Falls. Dr. Searer will be directly responsible for all production activities and Mr. Sontag for all plant technical matters at the Durez Plastics Division main plant at North Tonawanda, N. Y., as well as the newly-opened $5,000,000 molding compounds plant in Kenton, Ohio.

Marvel Wins Priestley Medal

Dr. Carl Shipp Marvel, research professor at the Noyes Chemical Laboratory of the University of Illinois and an authority on synthetic polymers has won the American Chemical Society's Priestley Medal for 1956. The gold medal, highest honor in American chemistry, will be presented to Professor Marvel for "distinguished services to chemistry" at the 129th meeting of the society at Dallas, Texas, in April. Professor Marvel, president of the society in 1945, directed an important part of the World War II research on synthetic rubber. He is widely known for major contributions to the development of plastics of the vinyl polymer type.

Forms New Chemicals Division

Pittsburgh Coke & Chemical Co., Pittsburgh, Penna., has announced the consolidation of its Coal Chemicals and Plasticizer Divisions into the newly created Industrial Chemicals Division. The new division, in addition to carrying on the production and sale of the company's coal chemical and plasticizer products, will included an expanded Product Development Section for the development and promotion of new industrial chemical products. The managements of the Industrial Chemicals Division will include Henry Avery, general manager; Duncan J. MacLennan, assistant general manager; and John L. Frothingham, sales manager. Alfred J. Oxenham will manage the division's Product Development Group, and Homer W. Fry will serve as superintendent of production. Territories for the division's sales representatives have been revised to permit more intensive coverage and service to its customers. Sales assignments will be as follows: New England—Richard J. Murphy; New York City—Harry W. Dudley; New York—Edward H. Winkleman; New Jersey—Thomas H. Boyd; Philadelphia—Walter H. Daub, Jr.; Pittsburgh—Raymond M. Wolber; Cleveland—Edison H. Shaw; Chicago—James F. Hall, Jr.; Los Angeles—William F. Saunders. Lawrence N. Holden, Jr. and William R. Blackstock have been transferred from the field sales force to the staff of the expanded Products Development Group and will be based at the company' home office in Pittsburgh.

Tenney Names Green Co.

Tenney Engineering, Inc., Union, N. J., have named John A. Green Co. as exclusive sales engineering representatives for Tenney environmental equipment in the southwestern United States. The John A. Green Co. whose main offices are in Dallas, Texas, will service the entire territory of Texas, Oklahoma, Arkansas, and Louisiana. Tenney officials emphasized that the appointment of the John A. Green Co. was the continuation of a long series of steps to insure quick competent, local attention for all environmental equipment buyers. Well-known in the electronic and environmental field, the John A. Green Co. is also a distributor of vibration equipment, electronic measuring instruments, data reduction systems, etc.

ASTM Committee Week Planned

The American Society for Testing Materials will hold its 1956 Committee Week at the Hotel Statler in Buffalo, N. Y., on February 27 to March 2. More than 250 ASTM technical committees and their subcommittees are expected to meet during the week to discuss and review the work they have done during the year in preparation for the completion of their year's work to be reported at the annual meeting in June. The only non-technical event of the week will be the dinner and entertainment on Wednesday evening, February 29, planned and sponsored by the Buffalo District Council. Among the committees scheduled to hold sessions during the week is D-11 on Rubber and Rubberlike Materials.

Dugan Retirement Announced

Frank J. Dugan, chief compounder for the Goodyear Tire & Rubber Co., Akron, Ohio, who retired on January 15 after 39 years' service, was honored on January 13 at an informal gathering of company executives and other associates. Dr. R. P. Dinsmore, vice-president in charge of research, was spokesman for the group in lauding the retiring veteran's outstanding record. He also was presented with a gift. Mr. Dugan (right), well-known as an authority on applications of synthetic rubber,

rose from an assistantship in the chemical laboratory to his post as head of the firm's world-wide tire compounding operations. Born and reared in Rutland, Vt., he was graduated from Rensselaer Polytechnic Institute where he majored in chemistry. After five years with the New York Central Railroad as a chemical engineer, he joined Goodyear where he has been associated with the compounding of all rubber products and their development ever since. He became chief compounder in 1943.

During World War II, Mr. Dugan was closely identified with the government's synthetic rubber program and made numerous contributions to the advancement and utilization of that material. His most outstanding service in that project was as chairman of the Synthetic Tire Committee, a group of major rubber representatives who pooled their knowledge of the then little-known synthetic in its application to tires and tubes, so as to alleviate the rubber shortage. Their findings were made available to all industry. Mr. Dugan also served on the tire committee of the War Production Board, and the committee on Conservation of Natural Rubber, the latter organized to promote and set standards for the use of synthetic rubber. Mr. Dugan also has traveled abroad in representing Goodyear.

Seeks Swiss Distributing Rights

V. Widmer, P. O. Box 24, Aarau, Switzerland, is interested in contacting American rubber manufacturers with an eye to representing these companies in Switzerland. Mr. Widmer is particularly interested in hearing from manufacturers of offset blankets, oil-resistant packings, rubber rollers for textile drawing frames, high-pressure packing plates and conveyor belting. Persons or companies interested in Swiss distribution should contact Mr. Widmer direct.

UC Forms Silicones Division

Union Carbide and Carbon Corp., New York, N. Y., has formed the Silicones Division to take over the responsibility for the development, manufacture, and sale of silicone products, according to Morse G. Dial, president. Mr. Dial stated that the formation of the new division reflects the expansion of the corporation's activities and its interest in the fast-growing field of silicones. This new Silicones Division will assume responsibilities in the field of silicones previously handled by Linde Air Products Co. Silicones, which have been marketed under the "Linde" trade-mark, will now be called "Union Carbide" silicones. William B. Humes, whose previous assignment was as vice-president of Union Carbide Canada, Ltd., has been appointed president of the new division. T. J. Coleman, formerly general manager of the Linde Silicones Department has been named general manager of the new division. Mr. Dial also said that capacity of the new silicone plant at Long Reach, West Va., will be enlarged early in 1956. It is planned to spend an additional $1,000,000 for expansion of the operation to increase the reactor capacity and install additional equipment for compounding silicone rubbers, he added. Production at the existing smaller silicone plant at Tonawanda, New York, will also continue, according to Mr. Dial.

May Build New Nylon Plant

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has begun a study to determine the possibility of locating a large nylon plant in Richmond, Va. No actual construction has been authorized but plans and estimates will be made to determine if a plant, capable of producing over 35,000,000 pounds annually of heavy denier nylon for use in tire cord and other industrial products, should be authorized. If approved, the plant would raise substantially DuPont's production of heavy denier nylon yarn. This type of heavy nylon, known as 840 denier, is 56 times heavier than the 15 denier which is the popular yarn in women's hosiery. DuPont at present manufactures both cellophane and rayon at the Richmond location. The nylon facility, if added, would be an addition to the existing plant for the production of super high tenacity rayon yarns in Richmond.

Bolta Division Expanding

A plant expansion program costing approximately $2,000,000 is now under way at the Bolta Products Division of the General Tire & Rubber Co., Lawrence, Mass. The division hopes to complete construction of a $350,000 addition by March 1. In it will be installed new machinery and equipment at a cost of between $1,500,000 and $2,000,000. Scheduled to begin production on October 1, the building will add 70,000 square feet of floor space to the present plant. Bolta currently employs about 1,500 persons at Lawrence.

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U. S. Rubber Promotes Cuthbertson

G. R. Cuthbertson

G. R. Cuthbertson has been promoted to assistant general manager of the Tire Division, U. S. Rubber Co., New York, N. Y., according to an announcement by H. N. Hawkes, vice-president and general manager of the division. Dr. Cuthbertson, who joined U. S. Rubber in 1936, has been production manager for the division for more than a year. R. E. Behrman, who had been assistant production manager, will succeed Dr. Cuthbertson as production manager. When he joined the organization, Dr. Cuthbertson was a research chemist and soon advanced to other positions, including assistant director of tire development at Detroit. He became assistant factory manager at Los Angeles in 1952, then factory manager and, in 1953, was named assistant production manager for the Tire Division. Dr. Cuthbertson received an A.B. degree from William Jewell College and M.A. and Ph.D. degrees from Harvard University. Mr. Behrman started with U. S. Rubber in 1922 as an office boy at the Indianapolis plant. Subsequently he worked at the Providence, Detroit and Los Angeles plants and at the Des Moines Ordnance plant from 1942 to 1944. He was factory manager of the Los Angeles tire plant from 1950 to 1952.

Parker Offers New Seal

O-ring seals molded from a new synthetic rubber compound developed especially for fuel oil service are now being offered by the Parker Appliance Co., Cleveland, Ohio. The new material is designated Parker Compound 37-751. It has Underwriters Laboratory approval for use with fuel oils, having undergone exacting tests with six different fuel cell oils. The company has also announced that Parker Compound 46-561 is now approved by UL for fuel applications. O-rings molded with this compound are especially recommended for use with gasoline, naphtha, kerosene, liquified petroleum gas and other similar fluids. Also announced is Parker Compound 66-103. O-rings molded of this compound are suitable for use with MLO-8200 and Monsanto OS-45 fluids at temperatures from minus 65 to plus 400°F. These O-rings are recommended for static seal applications.

Control of BWH Sought

In a letter to stockholders on January 30, John M. Bierer, president of the Boston Woven Hose & Rubber Co., Boston, Mass., disclosed that undisclosed principals are attempting to gain control of the company through the purchase of controlling stock interest. Mr. Bierer stated that he has met with the principals and that they assured him that if they managed to get control of the company it is their intention to continue the business and maintain it unchanged as to organization and policies. At a special meeting held on January 30, the board of directors of Boston Woven Hose considered the offer which had been put to them and were unanimous in their feeling that the offered price of $18.50 per share is a fair value of the company's common stock. The directors of the company have all agreed to deposit their stock. Mr. Bierer stated that while he is close to his normal retirement date, he has been requested to serve as president of the company through 1957. Because he believes that the prospective move will be constructive for the company, Mr. Bierer has agreed to accept the request.

Benzene Safety Data Sheet

The publications of a revised safety data sheet on benzene (SD-2) has been announced by the Manufacturing Chemists' Association, 1625 Eye St., N.E., Washington 6, D.C. The 20-page booklet, part of a continuing series of safety data sheets, gives properties and essential information for the safe handling and use of benzene, including material on shipping containers, storage, waste disposal and health hazards and their control. Benzene has wide usage as a starting point in the manufacture of many chemicals and as a solvent in the rubber, pharmaceutical, petroleum, dye, paint and varnish, textile, plastics, paper and other industries. Although toxic and flammable, benzene can be handled, shipped and stored safely, provided the personnel handling the product recognize the hazards and are thoroughly familiar with the necessary precautions. Copies of Chemical Safety Data Sheet SD-2, Benzene, may be obtained from the association, at 30 cents each.

Resiweld Bonding Adhesive

A new structural metal bonding adhesive called "Resiweld" has been announced by the H. B. Fuller Co., St. Paul, Minn. Resiweld will permanently bond aluminum, steel, zinc, copper, brass, iron, glass, wood, rubber, and plastic surfaces to themselves and to each other. The bonds formed are permanent and combine high structural strength with excellent impact resistance. Resiweld has remarkable resistance to solvents, grease, water and chemicals and the ability to withstand severe conditions of treatment and exposure, the company states. The adhesive is particularly suitable for manufacturing, assembling, laminating and repairing where high strength, permanent, structural bonds are required.

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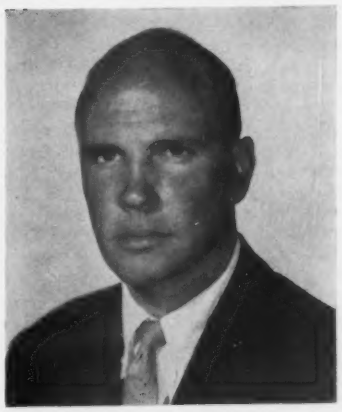
Hewitt-Robins Promotes Goodyear



Austin Goodyear

Austin Goodyear, vice-president and general manager of the industrial rubber, machinery and engineering divisions of Hewitt-Robins, Inc., Stamford, Conn., has been promoted to the position of executive vice-president of the company. Mr. Goodyear is a native of Buffalo, N. Y. He joined Hewitt-Robins in 1941, starting in the production department of the company's Passaic, N. J. plant. He left the company in 1943 to join the Air Force and was commissioned a 2nd Lt. in 1945. He returned to the production department of the plant in 1946 and was appointed production manager in 1947. He was transferred from production to sales in 1948 as assistant to the vice-president in charge of sales. He was named an assistant division general manager in 1952 and in the following year was made general manager. He was elected a director August 21, 1952, and a vice-president in August, 1953. He is a member of the Executive Committee of the Mechanical Goods Division of the Rubber Manufacturers Association.

Goodrich-Miami Expanding

B. F. Goodrich Co., Akron, Ohio, has announced plans to increase tire production at its Miami, Okla., plant. Work on the expansion will begin immediately according to officials of the company's Tire and Equipment Division. Representing another major enlargement of the Miami plant since production was started there in February, 1945, the new facilities, including buildings, utilities and equipment, will cost more than $4,000,000. One of the largest of the firm's tire plants, the Miami plant presently employs 1,500 persons and is one of the largest manufacturing operations in Oklahoma. The expansion program at the plant will substantially increase the company's capacity for large off-the-road tires, and will provide facilities for manufacturing off-the-road tires in sizes not presently produced by the company. A complete line of off-the-road tubeless tires for new wide base rims will also be made in Miami.

The Shoe Products Division of Goodyear Tire & Rubber Co. has established a new sales and service office in New York City.

A.T. & T. Settles Suit

An anti-trust suit against the American Telephone & Telegraph Co. was settled on January 24 on terms described by government attorneys as a major victory. Under the terms of the settlement, A. T. & T. must: (1) License 8,600 existing patents to all applicants without royalties; (2) License all its other patents, present and future, to any American concern at "reasonable and non-discriminatory rates"; (3) Get out of all business not directly connected with the communications field, and (4) Maintain uniform cost accounting methods for its manufacturing subsidiary, Western Electric. It was a civil suit, the government was not calling for a fine, but wanted the courts to order changes in the company's structure. Specifically, the government had asked that the parent corporation give up its interest in Western Electric, that Western Electric be dissolved and its assets divided among three other companies.

The judgment entered on January 24 allows Western Electric to continue as manufacturer to the Bell System. However, several important restrictions are put on the inter-company relationship. First, Western Electric is enjoined from paying any patent royalties to A. T. & T.—a transfer of funds within the system that might be used to justify higher cost figures for rate-making purposes. Western Electric is prohibited from manufacturing any equipment "not useful in furnishing common carrier communications services." Finally, Western Electric is directed to maintain "cost accounting methods which afford a valid basis for determining the cost to Western Electric of equipment sold to the Bell System."

St. Regis Kraft-Foam Sandwich

A combination of paper and foam rubber that may substitute for wood in many kinds of shipping containers has been announced by the St. Regis Paper Co., New York, N. Y. The new development is said to be especially suited to fresh vegetables, fruits and meats. Basically, the product is a sandwich of foam rubber between two layers of kraft paper and can be produced in a continuous sheet. Its chief qualities, according to St. Regis, are retention of strength under high compression and resistance to severe humidity. These, it was said, fill a long need of shippers for a lightweight container of low cost which is strong enough to stand up to refrigerator car dampness and long haul conditions. Patent applications have been filed.

Ansonia Wire to Move

Ansonia Wire & Cable Co. of Ansonia, Conn., is planning to transfer its operations to an industrial site near Berkeley Airport, R. I., north of Providence. It is expected that the company will take possession of its new site by March 1. It has taken a 20-year lease on the plant and upon expiration of the lease will own the plant. The firm produces vinyl insulated and jacketed wires and cables.

Sun Rubber Promotes Draper

C. E. Draper

C. E. Draper, assistant to the factory manager at the Sun Rubber Co., Barberton, Ohio, has been named technical director of the firm. Mr. Draper joined Sun Rubber after having served as factory manager of the Mid-States Rubber Co. in Evansville, Ind., for a period of five years. Previous to that, he was with the International Shoe Co. of Hannibal, Mo., where he held the position of process engineer in the Rubber Division. He is a member of the Division of Rubber Chemistry of the American Chemical Society.

Screen Utilizes Rubber Springs

The Colloids Section of the Franklin Institute Laboratories for Research and Development, Philadelphia, Penna., has been credited with an important share in the development of a new, highly efficient vibrating screen for classifying bulk products. The Conveyor Division of Hewitt-Robbins, Inc., at Passaic, N. J., is producing this new type of screen, known as the "hi-G" screen. In contrast to conventional screens using steel springs, the new screens are actuated by rubber reaction springs that vibrate at controlled resonant frequency. Advantages of using rubber springs are: power required is less than 40% of that needed for conventional screens; the screens are cheaper to maintain; and they can be built in larger sizes than before without losing efficiency. These screens are used for screening coal, ore, chemicals and other bulk materials. Since, with rubber springs, almost all of the power required to operate the screen comes from the stored and released energy of the springs, themselves, the exciter need supply only about 10% of the power for the operating stroke, enough to overcome frictional losses.

Diptex Out of Business

According to the New York Credit Men's Adjustment Bureau, Inc., the firm of Diptex, Inc., 1027 Grand St., Brooklyn 11, N. Y., has gone out of business. It is reported that much of the company's equipment has been sold at public auction. The firm formerly manufactured latex doll parts.

Rubber Division Spring Meeting

The Division of Rubber Chemistry of the American Chemical Society will hold its Spring Meeting on Wednesday, Thursday and Friday, May 16 through 18, at the Hotel Cleveland in Cleveland, Ohio. The local chairman for the meeting is C. A. Smith (N.J. Zinc.) The first technical sesion will start at 2:00 P.M. on May 16, with A. E. Juve, chairman, presiding. This sesion will be preceded by a regular meeting of the 25-Year Club. The deadline for abstracts of papers to be presented at the meeting is March 15. Abstracts should be of about 200 words, submitted to the secretary in triplicate. The secretary this year is A. M. Neal, E. I. du Pont de Nemours & Co., Inc., P.O. Box 406, Wilmington, Del. In an accompanying letter of transmittal, the author should inform the secretary as to the laboratory in which the work was done; who will deliver the paper, and how much time is requested. If the authors are chemists or chemical engineers resident in the United States, at least one of them must be a member of A.C.S. If a paper is to be presented by authors resident in the U. S. other than graduate chemists or chemical engineers, evidence should be submitted with the abstract that the proposed authors are ineligible for membership in ACS. Four copies of the finished paper are to be handed to the secretary at the meeting. Attention has also been called to the fact that nominations for the recipient of the Charles Goodyear Medal will be considered at the Cleveland meeting.

New Stabelan Stabilizers

Harwick Standard Chemical Co., Akron, Ohio, has announced two new cadmium-barium type liquid stabilizers, "Stabelan 110" and "Stabelan 115." Both stabilizers are said to be compatible with all currently used vinyl chloride polymers and copolymers, primary and secondary plasticizers, as well as organic and inorganic pigments. Stabelan 110 is a light brown liquid which does not possess any coloring power. It has a specific gravity of 1.006 ± 0.002. It is recommended for calender, solution and dispersion type polyvinyl chloride resins. It can be mixed in without any preblending or premilling at any stage of the application. Stabelan 115 is also a light brown liquid. It has a specific gravity of 1.015 ± 0.002. In other properties it is similar to Stabelan 110.

New England Cable Sold

New England Cable Co., Concord, N. H., has been sold to the General Insulated Wire Works of Providence, R. I., a subsidiary of the General Cable Corp., New York, N. Y. The firm was sold in compliance with a request of the late S. Dunsford, who had been president and treasurer of the company. New England Cable will continue to operate in Concord.

"Status of Automation in the Rubber and Plastics Industries" is the title of an article which has been reprinted from the June, 1955, issue of *Rubber World* by Hale & Kullgren, Inc., Akron, Ohio.

Firestone Promotes DiMaggio

Anthony J. DiMaggio

Appointment of Anthony J. DiMaggio as production manager of the tire manufacturing plant in Pottstown, Penna., has been announced by the Firestone Tire & Rubber Co., Akron, Ohio. Mr. DiMaggio's new position is that formerly held by Edward H. Hunnicutt who recently was named factory manager of the Firestone tire plant in Los Angeles. Prior to his promotion, Mr. DiMaggio had served as Chief Chemist of the Pottstown plant since 1950. Mr. DiMaggio was born in Cambridge, Mass. and attended public schools in Arlington, Mass. He graduated from Northeastern University, Boston, Mass., with a B.S. degree in 1943. He joined Firestone that year as a chemist in the Akron, Ohio, analytical laboratories and later was assigned to a position in laboratory compounding. In 1945, when Firestone began manufacturing tires in Pottstown, Mr. DiMaggio was assigned responsibilities as chief compounder, a position he held until 1950 when he was named chief chemist of the plant.

Acquires New Building Site

The acquisition of 70 acres of land in central New Hampshire for future expansion of the International Packings Corp. has been announced by David S. Williams, company president. This new property is about one mile from the present plant in Bristol, N. H. The company expects to use the new area for the purpose of eventually erecting a new building to house all the present facilities. Mr. Williams said, "The company's growth in the last year has strained its present housing facilities; management certainly expects continued industrial growth and will be prepared for it."

Cox Elected Vice-President

The election of Joseph E. Cox as vice-president of the Thermoid Co., Trenton, N. J., and general manager of Essex Rubber, a Thermoid division, has been announced by Warren E. Hill, president. Mr. Cox, a veteran of 32 years in the rubber industry, has been associated with Essex Rubber since 1946. Prior to that he worked for the Goodyear Tire & Rubber Co.

Named Division Chairman

Harris S. Woodman, formerly division president of the Wadsworth & Woodman Division of the Interchemical Corp. at Winthrop, Maine, has been named division chairman. Floyd Anderson, formerly plant manager and division controller, has been appointed general manager and will have the active management responsibility. Mr. Woodman, with his partner, founded Wadsworth & Woodman as an oilcloth company in 1905 and has headed the organization for many years. Today, this Interchemical unit produces a line of proofed goods. In his new position, Mr. Woodman will continue as an active consultant for the division, and will assume a similar function for Interchemical's Cotan Division in Newark, N. J., also a producer of proofed goods. He will participate in the formulation of policies for both divisions. Mr. Anderson has been associated with Wadsworth & Woodman for ten years. He is a graduate of Northeastern University and served with the U. S. Navy in World War II.

Heads Tire Mold Division

William H. Lotze of the National Rubber Machinery Co., Akron, Ohio, has been promoted to manager of the Tire Mold Division, Akron. With National Rubber Machinery since 1953, Mr. Lotze is now responsible for mold sales, engineering, and production coordination. Mr. J. L. MacDonald, who preceded Mr. Lotze and who has been with National Rubber Machinery for 27 years, will remain with the company in an advisory capacity.

Bakelite Promotes Benedito

John D. Benedito has been appointed general sales manager of the Bakelite Co., New York, N. Y., a division of the Union Carbide and Carbon Corp. Mr. Benedito joined Union Carbide in 1935, following his graduation from Yale University. He succeeds H. K. Intemann, who has been named executive vice-president of the Electro Metallurgical Co., also a division of Union Carbide.

R.B.H. Rebuilding Resin Plant

R.B.H. Dispersions Division of the Interchemical Corp., Bound Brook, N. J., announces that is has been definitely decided to rebuild the resin plant at Bauer, Utah, which was destroyed by fire last September. In rebuilding the plant, which produced "Resin 510", the company will incorporate expansion plans. It is estimated that the new plant will be on-stream on March 1, 1956.

Increases Silicone Production

Dow Corning Corp., Midland, Mich., has announced completion of the final unit in a $16,000,000 plant expansion program. Completion of the unit is reflected in a 7½% reduction in the price of dimethyl silicone fluids and emulsions, the company stated. The new plant facilities will more than double the previous methyl siloxane capacity of the company.

Thermoid Advances Muller

J. A. Muller

Thermoid Co., Trenton, N.J., has announced the appointment of J. A. Muller as technical manager of the Rubber Division. Formerly executive engineer of the Industrial Rubber Products Division, Mr. Muller will now supervise all research and development of rubber products at Thermoid's main plant in Trenton and at Nephi, Utah. Mr. Muller is a graduate in mechanical engineering of the Newark College of Engineering and came to Thermoid in 1943 from the Passaic, N. J., plant of U. S. Rubber Co. The holder of many patents on spiral cord hose, rotary hose, rotary hose couplings, Mr. Muller also pioneered the development and manufacture of wire braid hydraulic hose in the United States. Thermoid's Nephi plant was designed and laid out by Mr. Muller.

American Viscose Names Ross

Joseph E. Ross has been named leader of the Tire Yarn Section of the Research and Development Division of the American Viscose Co. at Marcus Hook, Penna. Mr. Ross succeeds Dr. Wayne A. Sisson, who is now leader of the Cellulose Section at the research center. Mr. Ross joined American Viscose in 1954 as head of experimental spinning. A chemical engineering graduate of Rose Polytechnic Institute, he was formerly a technical administrator of chemical and mechanical engineering projects at Georgia Institute of Technology.

Johnson Named Chief Engineer

Robert R. Johnson has been named chief engineer for Minnesota Rubber and Gasket Co., Minneapolis, Minn., according to Robert W. Carlson, vice-president. Mr. Johnson will be in charge of all engineering operations for the concern, which manufactures a variety of custom molded rubber products and seals. Previous to his appointment, Mr. Johnson was general manager of Master Tools, Inc., a subsidiary of Minnesota Rubber. He has been connected with the design and production of tools and related equipment for the past 14 years.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 803.

Names in the News

AUSTIN L. HAWK, associated with Raybestos-Manhattan, Inc., since 1929, has been named manager of the western sales district of the company.

JOAN BUTLER has joined the Research and Development Department of the Barrett Division, Allied Chemical & Dye Corp., New York, N. Y., where she will write and edit technical and promotional literature.

GEORGE F. COMIENSKI, since 1954 manager of aviation products merchandise distribution for the Goodyear Tire & Rubber Co., has been appointed manager of general merchandise and material control at the company's New Bedford, Mass., plant.

RAYMOND A. ALL, associated with the U. S. Rubber Co. since 1937, has been named assistant to the vice-president and general manager of the Textile Division.

DR. WALLACE E. CAKE, vice-president of the U. S. Rubber Co., has been named chairman of the rubber industry's campaign for the 1956 Greater New York Appeal of the National Foundation for Infantile Paralysis.

H. C. HOWELL, formerly associated with the Barber Oil Corp., has been named chief chemist for technical development of the Pioneer Products Division, Witco Chemical Co.

JOHN J. ZICCARELLI, previously associated with the California Texas Oil Co. and the Socony Mobile Oil Co., has been named to the Technical Sales Department of the Glyco Products Co., New York, N. Y.

ROBERT A. OBERFELL, associated with the New Jersey Zinc Co. since 1947, has been appointed assistant secretary.

ALFRED J. MAYBORN, associated with the Firestone Tire & Rubber Co. since 1929, has been appointed manager of the Expense Control Division of the comptroller's office.

FRANK S. GRIESINGER, manager of the Retread and Repair Materials Section of the Goodyear Tire & Rubber Co., recently celebrated his 40th year of continuous service with the company.

DR. S. D. DOUGLAS, associated with the Carbide and Carbon Co. since 1926, has been appointed senior scientist in the Research Department.

GEORGE L. BOND and E. S. ROTHROCK have been elected directors of the Stauffer Chemical Co. Mr. Bond was formerly president and Mr. Rothrock executive vice-president of Consolidated Chemical Industries, Inc., which merged with Stauffer last November.

W. F. OSLER, JR., formerly vice-president and general manager of the Cornish Wire Co., New York, N. Y., has been elected president succeeding JOHN COOK.

HARPER V. BRESSLER, assistant sales manager of the Industrial Products Division of the Goodyear Tire & Rubber Co. since 1931, retired on February 1.

STEWART M. WOOD has been appointed sales manager of Ball & Jewell, Inc., Brooklyn, N. Y.

NORBERT S. MASON has joined the staff of the Goodrich Research Center at Brecksville, Ohio, as a technical man, while Robert J. Fawcett has joined the center as a research chemist.

WILLIAM H. CAMPBELL, formerly Pittsburgh district manager of replacement tire sales for the B. F. Goodrich Co. Tire and Equipment Division, has been named manager of the Truck Tire Sales Department with headquarters in Akron, Ohio.

HARRY D. ARMITAGE, New York sales representative for Emery Industries, Inc., was recently honored by the company on his completion of 30 years' service.

WILBERT E. CHOPE, president of Industrial Nucleonics Corp., Columbus, Ohio, has been selected as the "Outstanding Young Electrical Engineer of 1955" by Eta Kappa Nu, electrical engineers honorary fraternity.

A. K. DOOLITTLE, associated with the Carbide and Carbon Co. since 1932, has been appointed senior scientist in the Research Department of the company.

JOSEPH E. POWERS, sales manager of the truck and bus tire department of the B. F. Goodrich Co. Tire and Equipment Division, retired on January 31 after more than 45 years with the company.

JOSEPH E. NOLAN, formerly associated with the Westvaco Mineral Products Division of the Food Machinery & Chemical Corp., has joined the technical sales department of the Glyco Products Co.

CHARLES J. TINSLEY, formerly manager of the southeastern division of the Thermoid Co., has been named assistant sales manager of the Industrial Rubber Division.

ROBERT GRANT, manufacturing manager of the Standard Products Co., has been elected a director of the concern.

RICHARD Y. CASE, chief engineer of the Power Transmission Department, U. S. Rubber Co., has been awarded the Edward Longstreth Medal of the Franklin Institute of Philadelphia for his invention of the timing belt.

JAMES W. COOLEY, formerly publicity director for the Wooster Rubber Co., has been named head of the newly-organized Marketing Research Division.

JAMES F. TURNER, formerly associated with the B. F. Goodrich Co., has joined the National Seal Co. as rubber process engineer.

JOHN D. BEGGS, formerly president of Gelvatex Coating Corp., has joined the sales staff of National Starch Products, Inc., where he will direct the sales of vinyl resins to the paint and protective coatings industries.

FRANK S. WARD, general sales manager of the Taylor Instrument Companies has been elected a director and member of the Executive Committee.

H. A. VOSKAMP, JR., formerly manager of thermoplastic sales for the Barrett Division, Allied Chemical & Dye Corp., has been named to the newly-created position of assistant manager, molding compound sales.

JAMES D. RUSSELL, associated with the Young Brothers Co. since 1946, has been elected vice-president and general manager of the company.

JAMES HENRY ALEXANDRE has been named secretary of the American Synthetic Rubber Corp. and executive assistant to the president.

WALTER E. FLOYD, associated with the Goodyear Tire & Rubber Co. since 1920, has been named superintendent of the company's textile mills at Cartersville, Ga.

BRUCE E. ESTERLY, controller of the Cooper Tire & Rubber Co., has been elected to membership in the Controllers Institute of America.

EARL KOCHERSPERGER, associated with the U. S. Rubber Co. since 1930, has been appointed eastern regional sales manager of coated fabrics.

MARTIN VANDER LAAN, with Hewitt-Robins, Inc., since 1934, has been appointed manager of operations of the Engineering Division of the company.

W. T. MEINERT, formerly assistant director of development and service for Emery Industries, Inc., Cincinnati, Ohio, has been named director succeeding N. A. RUSHTON, who retired on February 1. Mr. Rushton will continue with the company in a consulting capacity.

EDWIN H. SCHWARZE has been appointed technical service representative of the Pioneer Products Division of the Witco Chemical Co., New York, N. Y.

"Trouble-Shooting Chart for Hydraulic Systems" is the subject of a new wall chart now offered by the Sun Oil Co., 1608 Walnut St., Philadelphia 3, Penna. The two-color chart will help operators and maintenance men spot and cure common troubles.

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Financial News

Dayton Rubber Co.

Year Ended October 31: Net profit of $2,321,477, which is equal to $3.77 per common share, compared with $1.80 a common share in the 1954 fiscal year. Net profit in the year ended October 31, 1955, was 101% greater than net profit in the previous fiscal year. Sales in the 1955 fiscal year amounted to $69,150,073, 24% greater than in the previous fiscal year. Net worth of the company has grown to an all-time high of $18,071,000, an increase of $1,704,206 from the 1954 figure.

Lee Rubber & Tire Co.

Year Ended October 31: Net income of $1,750,071, which is equal to $2.06 a share, compared with $1,400,295, or $1.66 a common share in the preceding fiscal year. Net sales for the 1955 fiscal year totaled $45,912,226, an increase of 16% over the $39,385,382 in net sales in the 1954 fiscal year. Share earnings have been adjusted to reflect a three-for-one stock split effective March 15, 1955.

Lea Fabrics, Inc.

Six Months to November 30: Net loss of $354,000 compared with a net loss of $282,316 in the corresponding period of the previous year. The net loss figures were computed after depreciation of $45,000 in 1955 and $48,000 in 1954 and before a tax credit of $185,000 in 1955 and $146,000 in 1954.

Boston Woven Hose & Rubber Co.

Quarter to November 30: Net income of $152,096, which is equal to 38c per common share, compared with $61,349, or 11c per common share, in the quarter ended November 30, 1954.

A. G. Spalding & Bros., Inc.

Year Ended October 31: Net income of $580,630, which is equal to $1.04 a share, compared with $779,553, or $1.47 a share, in the 1954 fiscal year. The 1955 fiscal year net income reflects a net loss of $326,691 resulting from water damage caused by Hurricane Diane. Net sales in the year ended October 31, amounted to $26,857,810, against $27,192,465 in the previous fiscal year.

Swan Rubber Co.

Twelve Weeks to October 22: Net income of $246,634, which is equal to 39c a common share, compared with $138,364, or 22c a share, in the corresponding period of the previous year. Net sales in the twelve weeks ended October 22 amounted to $3,373,557, against $2,385,590 in the twelve weeks ended October 30, 1954.

Ansonia Wire & Cable Co.

Year Ended October 31: Net loss of $10,155, reflecting a net loss of $112,428 on the sale of real property during the period. In the previous fiscal year, net income amounted to $148,806, which is equal to $1.40 a share.

Rome Cable Corp.

Nine Months to December 31: Net income of $1,370,000, which is equal to $2.86 a share, compared with $644,000, or $1.25 a share, in the corresponding period of the preceding year.

MacGregor Sport Products, Inc.

Year Ended October 31: Net income of $487,033, which is equal to $2.86 a share, compared with $452,896, or $2.80 a share, in the previous fiscal year.

Pact Joins Quaker Chemical

Harry H. Pact has joined the sales staff of Quaker Chemical Products Corp., Conshohocken, Penna. Mr. Pact received his formal education in Vienna, Austria. He was at one time associated with Burlington Mills Corp. as a chemist and dyer and then with L. Sonneborn Sons, Inc., as a member of their laboratory staff. Since 1946 he has been engaged in chemical sales, first as a divisional manager for E. F. Drew & Co., Inc., then as technical representative for Glyco Products Co., Inc., with whom he was connected during the past five years before joining Quaker. Mr. Pact makes his headquarters in Cranston, R. I., and will be engaged with the distribution of specialty chemicals to the textile, paper, and allied trades. His representation of Quaker Chemical in these latter fields marks the entry of this company into the territory of paper chemicals and other applications of specialty compounds outside the textile and metal-working areas.

Forms New Planning Department

A new production planning department has been formed by the Tire Division of U. S. Rubber Co., New York, N. Y., to coordinate more closely tire production scheduling and customer service. The new department, which will have its headquarters in Detroit where the largest of the divisions five plants is located, can do much to bring about more efficient use of division production facilities as well as improve customer service, company officials said. Curtis L. Moody, formerly factory manager of U. S. Rubber's Detroit tire plant, has been named to head the new department as production planning manager, Hugo W. Weisse has been named assistant to Mr. Moody. Harold E. Weigold, formerly factory manager of the company's tire plant in Chicopee Falls, Mass., has been transferred to the Detroit plant as factory manager succeeding Mr. Moody. S. Edward Harrison succeeds Mr. Weigold as factory manager at Chicopee Falls.

Kallgren Joins Congoleum-Nairn

John E. Kallgren

The appointment of John E. Kallgren as chief engineer for Congoleum-Nairn Inc., Kearny, N. J., has been announced by D. F. Jurgensen, director of engineering and development. For the past ten years, Mr. Kallgren has been associated with the Seiberling Rubber Co. of Akron, Ohio, where he served successively as chief engineer and plants manager. In the latter capacity, he was responsible for production and engineering in the three domestic Seiberling plants. Prior to joining Seiberling, Mr. Kallgren served with the Central Engineering Department of the U. S. Rubber Co. for three years, and with the Central Engineering Department of the Firestone Tire and Rubber Co. for ten years.

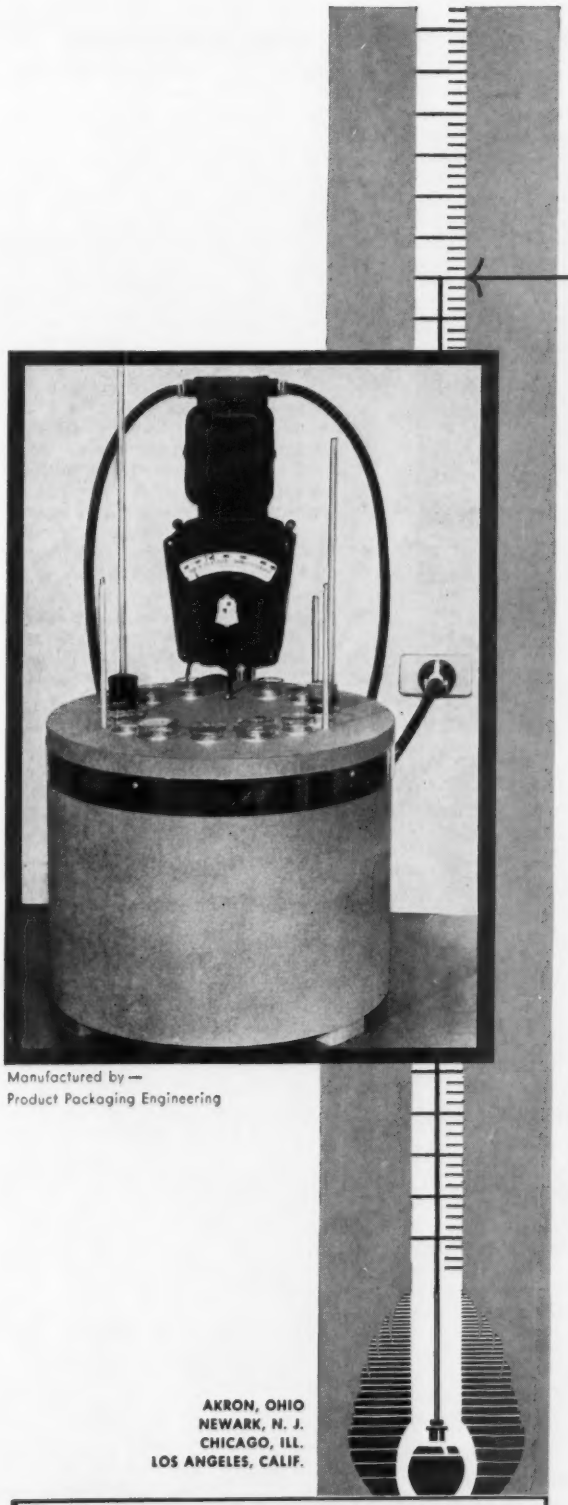
Raises Heel and Sole Prices

Increased prices on heels, soles and related shoe products, ranging from three to six percent, were announced on January 25 by the Shoe Products Division of Goodyear Tire & Rubber Co., Akron, Ohio. Frank R. Evans, general manager of the division, said: "In spite of improved operating efficiencies, these increases are necessary to cover increased labor and material costs that have been accumulating over the past several months." Mr. Evans said the increase in prices affects all products in the line. The amount of increase on each item was determined by current cost of its production.

de Decker Resigns Post

Dr. H. C. J. de Decker, director of research for Rubber-Stichting, Delft, Holland, since January 1, 1950, has resigned from that organization and accepted a position with the U. S. Rubber Co., New York, N. Y. The Indonesian Government recently made known its intention of moving Rubber-Stichting to Indonesia. Dr. de Decker was to have sailed for the United States in January.

Want to make your opinion known? Write a letter to the editor! (See page 654).



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RMA Expands Activities

The Rubber Manufacturers Association, New York, N. Y., has expanded its activities to include manufacturers of vinyl flooring, according to an announcement by R. R. Ormsby, president of the association. The vinyl manufacturers' group will become part of the RMA Flooring Division, Mr. Ormsby said. The following seven companies were represented at the organization meeting which was held in the Warwick Hotel, New York, Thursday, January 26: American Biltrite Rubber Co. of Trenton, N. J.; Danbury Rubber Co., Danbury, Conn.; B. F. Goodrich Co., Watertown, Mass.; Goodyear Tire & Rubber Co., Akron, Ohio; Hewitt-Robins, Inc., Fremont, Ohio; Kentile, Inc., Brooklyn, N. Y., and Vinyl Plastics, Inc., Sheboygan, Wisc. "This group for the present will be interested only on what is generally known as homogeneous vinyl", Mr. Ormsby stated. "This excludes those products referred to in the trade as felt-back vinyl, asbestos vinyl and black -backed vinyl flooring." "The new RMA vinyl flooring group has set for immediate action the following projects: Development of product specifications, recommended installation methods and recommended maintenance methods. A meeting of the group's technical committee has been called for late February to get this program into operation."

Naugatuck Promotes Tierney

Martin J. Tierney has been appointed commercial development manager of the Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. Mr. Tierney, who was formerly assistant commercial development manager, replaces Clayton Ruebensaal. Mr. Ruebensaal is now director of commercial planning for the Texas-U. S. Chemical Co., a firm owned jointly by the Texas Co. and U. S. Rubber. Mr. Tierney is a graduate of Middlebury College, Vt., and attended the Stuttgart Technische Hochschule, Germany. He joined Naugatuck Chemical in 1936 as a control chemist. In 1950 he was appointed manager of market research and in 1954 became assistant commercial development manager. For two years, following World War II, he was loaned to the government where he was assistant production manager for the Office of Rubber Reserve.

Named to New Research Post

William H. Spratling has been appointed to the new post of assistant director of purchases for the U. S. Rubber Co., New York, N. Y. A graduate of Annapolis and a former U. S. Navy lieutenant, Mr. Spratling joined U. S. Rubber as a trainee buyer in 1947 after leaving the Navy. He became a buyer of machinery and metals about three months later. He was later assigned to other buying posts in the Purchasing Department and has purchased textiles, rubber and packaging materials. He also recently completed the Advanced Management Program at Harvard University. Mr. Spratling is a native of Hogansville, Ga. Before entering Annapolis, he also attended the University of Georgia.

Completes 30 Years' Service

Completing 30 years of service with the B. F. Goodrich Co. on January 1, President William S. Richardson (left) received the congratulations of chairman of the board, John L. Collyer, who presented him with a wrist watch in the company's Akron, Ohio, offices. His first Goodrich assignment was supervisor of the Planning Department in the company's main plant in Akron and four years later he became staff superintendent of the company's In-

dustrial Products Division. In 1931, he was named merchandising manager of the division and in 1938 became division general sales manager. He was appointed general manager of the Industrial and General Products Division in 1941. On the organization of the B. F. Goodrich Chemical Co. in April, 1945, Mr. Richardson was elected president. In April, 1951, he became executive vice-president, a director of the company and a member of the executive committee of the board of directors.

When John L. Collyer, who had been chairman of the board, president and chief executive officer of the B. F. Goodrich Co., relinquished the presidency in April, 1954, Mr. Richardson was elected president. He was the first president of Goodrich-Gulf Chemical Co., Inc., owned half by Goodrich and half by the Gulf Oil Corp., and is a director of that company. Mr. Richardson is a veteran of World War I and during World War II was chairman of O.P.A. Mechanical Rubber Goods Advisory Committee. He is a director of the Rubber Manufacturers' Association, a member of the National Industrial Conference Board, and a member of the Board of Trustees of Case Institute of Technology, Cleveland, Ohio. He was an industry representative on President Eisenhower's Highway Safety Committee activated in March, 1954.

Esso Appoints John E. Wood

Esso Standard Oil Co., an affiliate of the Standard Oil Co. (N.J.), has announced the appointment of John E. Wood as general manager of the Chemical Products Department. He succeeds O. V. Tracy, who will continue as a director of Esso. Mr. Wood has been assistant general manager of the department since last September.

To Vote on Stock Proposal

Common and cumulative preference stockholders of the General Tire & Rubber Co. will vote at a special meeting on February 24 on proposals to increase the authorized number of common and preference shares of the company. William O'Neal, president, said stockholders will be asked to approve an increase in the authorized common shares to 2,500,000 from the presently authorized 1,750,000 shares as well as an increase in the authorized preference shares to 1,000,000 from the present 350,000. Of the preference shares, not more than 600,000 would be outstanding at any one time without approval of a majority of common and preference stockholders.

Holders will also be asked to approve a proposal that upon the issuance of debentures the company may include a privilege to convert the debentures into common stock and permitting the company to issue warrants to purchase common, provided the total that may be issued does not exceed 400,000 shares. While no plans for issuance of new stock were disclosed, the company has been following a wide diversification program in recent years and additional expansion of productive capacity for chemicals, plastics and tires is anticipated.

Expanding Cycolac Facilities

Roy C. Ingersoll, president of the Borg-Warner Corp., Chicago, Ill., has announced that the corporation has undertaken "a major expansion" in the plastics manufacturing field by appropriating $10,000,000 for the erection of a highly modern chemical plan on a recently purchased 322-acre site at Washington, West. Va. Construction of the plant was necessitated, Mr. Ingersoll said, by "a market exceeding our highest expectations" for a new-type thermoplastic resin called Cycolac which was developed and is being produced by the Marbon Chemical Division of Borg-Warner. The demand for the new material greatly exceeds the production capacity of Marbon's present two plants at Gary, Ind., it was said. The new plant will consist of a series of individual buildings dispersed over nearly one-half of the acreage, with particular regard given to the maximum safety and efficiency of operation, Mr. Ingersoll said. A substantial section of the plant will be devoted to facilities for processing the Cycolac synthetic resin into a variety of colors.

Connecticut Elects Officers

The Connecticut Rubber Group has announced the election of new officers for the 1955 season. Members elected to office are: *Chairman,* James Boyle (Armstrong Rubber); *Vice-Chairman,* Harry Gordon (Bond Rubber); *Secretary,* W. R. Bull (Goodrich); *Treasurer,* R. T. Zimmerman (R. T. Vanderbilt). The group also announced the election of the following directors: G. A. Di Norscia (Goodrich), Warren Carter (Pequanoc), B. M. Fairbanks (G-E), Otto Lang (K.B.C. Industries) and G. B. Jerolman (Armstrong Rubber). Mr. Lang was also appointed educational chairman and Mr. Gordon was named publicity chairman.

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Appointed Production Manager

Appointment of E. H. Strobel to the newly-created position of production manager of the tire manufacturing plant in Des Moines, Iowa, has been announced by the Firestone Tire & Rubber Co., Akron, Ohio. Formerly plant manager of the company's tire plant in Buenos Aires, Argentina, Mr. Strobel went to Des Moines in 1954 to serve as manager of passenger and heavy duty tire inspection. Mr. Strobel was born in Boston, Mass., and received his grade school and high school education in Port Huron, Michigan. He received a bachelor of science degree in engineering from Ohio State University at Columbus, and a master of science degree in rubber chemistry from the University of Akron, studying under a Firestone Fellowship. He joined the Firestone organization in 1941 as a chemist in Akron, Ohio. Following his discharge from military service in March, 1946, he returned to Firestone in Akron and served in the Plant 1 Production Division. In 1948, he was transferred to the Buenos Aires plant to take charge of several manufacturing departments. He became production manager of the plant in 1949 and was named plant manager in 1951.

Polite Named to New Post

L. J. Polite, Jr., for the past two years agricultural chemicals sales manager in the Chlorinated Products Division of the Diamond Alkali Co., Cleveland, Ohio, has taken over a new and broader assignment following a re-alignment of responsibility. In announcing the change, Loren P. Scoville, general manager of the division, said that Mr. Polite now becomes sales manager for a diversified group of organic chemicals having wide industrial application. He succeeds W. B. Beeson, Jr., recently named manager of Diamond's New York-New England branch sales office in New York City. At his new post, Mr. Polite holds sales management responsibility for Chlorowax, a Diamond-developed chlorinated paraffin available in liquid and resinous forms; chlorinated solvents (perchlorethylene, carbon tetrachloride and muriatic acid); and chloromethanes (methyl chloride and methylene chloride), which are produced at the company's Belle (West Va.) plant.

Carbide Announces Appointments

Several changes in the Works Manager's Department have been announced by the Carbide and Carbon Chemicals Co., New York, N.Y. A. P. Moss has been appointed industrial chemicals production manager, and will be located in the New York offices of the company. Mr. Moss was superintendent—chemicals and resins at the company's South Charleston, West Va., plant. Max Hill has been appointed fine chemicals production manager and will be located in the New York offices of the company. Mr. Hill was assistant superintendent at the company's South Charleston plant. W. W. TenEyck has been appointed superintendent—chemical and resins at the company's South Charleston plant.

General-Byers Merger Planned

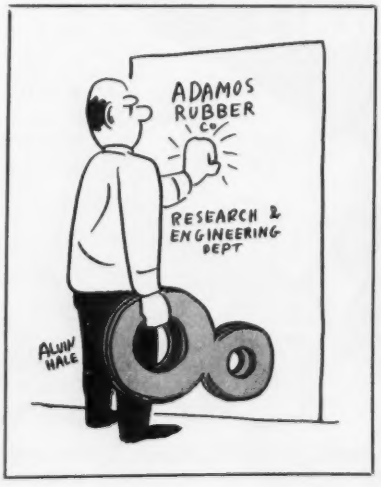
A. M. Byers Co., Pittsburgh, Penna., has confirmed reports that the General Tire & Rubber Co. of Akron, Ohio, has agreed to acquire a substantial interest in Byers and is considering a merger. The Byers concern is the largest U. S. producer of wrought iron. A. B. Drastrup, in a letter to stockholders asking a vote of confidence in management at the annual meeting which had been scheduled for January 26, enclosed a copy of a letter from William O'Neil, president of General Tire, which said the company has "committed ourselves to the purchase of 60,000 shares of Byers common stock from J. Frederic Byers, Jr. and Buckley M. Byers. We have also acquired from J. Frederic Byers, Jr., and Buckley M. Byers, personally, options to buy 5,139 shares of preferred at the call price and 27,300 shares of common at below the market price." The Byers announcement added that acquisition of these shares "would give General Tire ownership of approximately 30% of the outstanding shares" of Byers.

Thermoid Acquires Mexican Plant

Thermoid Co., Trenton, N. J., has announced the acquisition of a new plant in Mexico City, Mexico, which will be used for the production of automotive brake lining and related products. The plant will utilize locally recruited labor. Local supervision of the plant will be under Alfred Strasser, a resident of Mexico City. Thermoid's products have been identified with Mexico's automotive industry for many years, and its products are widely used in the replacement market.

Named to Philadelphia District

Martin G. Levens has been named Philadelphia district sales manager for the Columbia-Southern Chemical Corp., Pittsburgh, Penna. A graduate of Gettysburg College, Mr. Levens joined Columbia-Southern's sales office in Cleveland, Ohio, during 1947. He has served as assistant district sales manager at Philadelphia during the past year. Mr. Levens succeeds Paul A. Fodor, Jr., who was recently appointed assistant director of sales.



Boyer Joins Hooker Research

Dr. Nicodemus E. Boyer has joined the Research and Development Department of the Hooker Electrochemical Co., Niagara Falls, N. Y., and has been assigned to the exploratory organic research group. Born in Daugavpils, Latvia, Dr. Boyer later moved to Germany where he studied at the University of Goettingen from 1946-1949. Entering the United States he attended the University of Illinois, receiving the bachelor's and master's degrees in chemistry in 1951 and 1952 and the doctor's degree in organic chemistry in 1955. Dr. Boyer was granted a fellowship as a research assistant at Princeton University where, for the past year, his post-doctoral studies have been mainly directed toward heterocyclic N-oxides. In 1955, two of his papers, "Furoxans from Methyl Ketones and Nitric Acid", and "Infra Red Spectra of Furoxans", appeared in the Journal of the American Chemical Society. Dr. Boyer is a member of the Illinois State Academy of Sciences as well as Sigma Xi and Phi Lambda Upsilon, honorary scientific societies.

Goodyear-Windsor Appointments

Ivan Thomas has been appointed production superintendent and Ralph L. Quinlan has been promoted to assistant development manager of the Windsor, Vt., shoe products plant of the Goodyear Tire & Rubber Co. Mr. Thomas was transferred to the Windsor plant recently from Gadsden, Ala., where he had been in charge of production of shoe products since 1950. A native of Maine, Mr. Thomas began his career with Goodyear as a cure operator in 1936. He worked on many supervisory jobs before appointment to the Gadsden post. Mr. Quinlan is a graduate of the company's squadron training program. He has been a compounder in the development department of Goodyear's Windsor plant since 1951. Born in Canada, Mr. Quinlan attended high school at Malden, Mass., and received chemical engineering training at Massachusetts Institute of Technology. He joined Goodyear shortly after graduation from M.I.T. in 1950.

Firestone Re-Elects Officers

At the annual meeting of stockholders of the Firestone Tire & Rubber Co. on January 21 in Akron, Ohio, all directors of the company were re-elected. Following the annual meeting of stockholders, the board of directors re-elected all principal officers and named two new officers. The new officers are Byron H. Larabee, assistant secretary, and Eldon H. Eaton, assistant treasurer. Mr. Larabee was also elected president of the Firestone Plantations Co. Mr. Larabee joined the Firestone organization in 1939 and in 1942 was named executive vice-president and a director of the Firestone Plantations Co. Mr. Eaton joined Firestone in 1926. In 1953, he was named operating manager of the trade sales department.

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West Coast News

Two management changes at the Tire and Equipment Division plant of the B. F. Goodrich Co. at Los Angeles have been announced by J. Earl Gulick, vice-president of manufacturing. Frank E. Harper was named plant manager in charge of manufacturing. He formerly was production superintendent. Mr. Harper succeeds James F. Sweatt who is retiring. Also named to a new assignment is J. A. Sharkey who becomes production superintendent succeeding Mr. Harper. He was formerly night shift superintendent.

Mr. Harper first joined the B. F. Goodrich Co. at Akron, Ohio, in 1946. Prior to that he was assistant to the president of the Austral American Corp. in New York. Mr. Harper served during World War II as a Lieutenant Colonel in charge of the proving grounds at Camp Seeley, El Centro, Calif., in the testing of tires and tank tracks for desert operation. He served in a similar capacity at Camp Holabard, Baltimore, Md. Later, in an overseas assignment for the U. S. Army, he helped to operate rubber plants in France, Belgium and Holland. He was general foreman of tire building for the company at Akron before moving to Los Angeles in 1950. He is a graduate of the University of Akron.

Mr. Sharkey was named general foreman of tire curing at Akron in 1950. He transferred to the Los Angeles plant in April, 1955. He holds a degree in engineering administration from Case Institute of Technology, Cleveland.

Edward H. Hunnicutt has been named plant manager of the Firestone Tire & Rubber Co. tire manufacturing plant in Los Angeles. Mr. Hunnicutt has been factory manager of the Firestone tire manufacturing plant in Pottstown, Penna., since April of this year. He will succeed R. E. McGee, who died November 5. Mr. Hunnicutt is a native of Washington, D. C., attended public schools there and was graduated from George Washington University with an A.B. degree. He received his M.A. degree from the University of North Carolina.

In June, 1929, Mr. Hunnicutt joined Firestone and held various positions in the Firestone tire manufacturing plant in Buenos Aires, Argentina, from 1932 to 1945, when he returned to this country as production manager of tires and tubes at Des Moines, Iowa. In 1949 he became production manager of tires and tubes at the Pottstown plant and in April of 1955 was named factory manager.

Wharton Jackson Co., San Marino, Calif., has announced the appointment of William J. Moore as technical sales and service representative in the San Francisco Bay area and the Pacific Northwest. Mr. Moore was graduated from the University of California in 1949 with a degree in chemistry. He has had 6 years' experience in rubber production and research with one of the leading manufacturers in the Bay area from which he resigned to take over his present position. Mr. Moore is also affiliated with the Northern California Rubber Group serving in the capacity of treasurer for the year 1956.

William J. Moore

Wharton Jackson Co. are exclusive sales agents for Petaca Mining Corp. of New Mexico, producers of "wet process" and "Jet-milled" muscovite mica; Huntley Industrial Minerals, Inc., Bishop, Calif., producers of talc, clay and pyrophyllite and are western representatives for the Georgia Kaolin Co., producers of kaolinite clays.

A plant for the production of synthetic latex will be built at Pittsburg, Calif., by the Dow Chemical Co. R. L. Curtis, vice-president and general manager of Dow's Western Division, said construction would start at once. It is expected the facility will be in production this Fall. Mr. Curtis estimated the plant will cost in excess of $1 million, and said it would be capable of producing a broad range of styrene-butadiene latices which are widely used in the manufacture of paints, coated papers and other products. Similar latices are now being manufactured by Dow at Midland, Mich., Velasco, Texas, and Sarnia, Ontario, Canada.

Appointment of two sales executives by C. W. Thorp, Western Division tire sales manager, have been announced by Dent W. Sanford, vice-president, Goodyear California. They are Clifford C. Anderson, as assistant division manager retail for the Western division, and Elmer Heideman, as Southern California tire sales district manager. Both will have headquarters in Los Angeles. Mr. Anderson replaces R. W. Fairchild, who has been transferred to Akron as merchandise manager of all Goodyear retail stores.

K. R. Simpson, Jr., president of the Pacific Moulded Products Co., Los Angeles, has announced the purchase of Swimaster, Inc. of Huntington Park, Calif., a producer of underwater skin diving and surface diving equipment.

Stillman Rubber Co., Culver City, Calif., has acquired Extruded Products Co., Fullerton, Calif. producers of extruded rubber products for the aircraft and building trades industries, Harold Sears, president, announced recently. The new acquisition will be operated as the Extruded Products Division and will extend Stillman services into the field of extruded rubber and silicone tubing, Mr. Sears added. V. L. Neschke will continue as vice-president and general manager of the division at the same location, 1222 E. Ash St., Fullerton. Joel Bush was named vice-president in charge of production. With divisions in California and Cleveland, Ohio, Stillman produces a wide range of custom molded parts, silicone and synthetic rubber O-rings, and hydraulic packings to government and commercial specifications. The company has pioneered development of "Permadizing," a unique rubber-to-metal bonding process.

Joe Carol, formerly comptroller of the Stillman Rubber Co., Culver City, Calif., has been elected secretary-treasurer of the company.

Midwest Rubber Reclaiming Co. has announced the appointment of Howard R. Erwin as manager of the Paramount plant, succeeding H. R. Painter who will return to East St. Louis for a new assignment.

Personnel Shifts at Goodyear

Three important changes in personnel at three Goodyear Tire & Rubber Co. plants have been announced by the company. H. M. "Mel" Hood, personnel manager at the company's Topeka, Kan. plant since its opening in 1944, has been named manager of the new Goodyear plant now nearing completion at Cali, Columbia. The company's present South American plant at Cali has been in operation some 10 years. Tires, tubes and repair materials are the chief products manufactured. A veteran of 20 years with the company, Hood will relieve J. W. Holley, present plant manager, who will return to Akron for assignment in the development department. Replacing Mr. Hood at Topeka is Alton A. Werner, until now personnel manager at Goodyear's Lincoln, Neb. plant. He has held this post since 1951, and has some 17 years' service. Mr. Werner in turn is succeeded as personnel manager in Lincoln by David E. Murray, manager of the efficiency department at the plant for the past five years. He has nearly 27 years' service with the company.

Doig Joins Michigan Chemical

Michigan Chemical Corp., Saint Louis, Mich., has announced the appointment of Arthur K. Doig to its organic research staff. Mr. Doig received his B.S. degree in 1944 from St. Lawrence University, Canton, N. Y. After working in the chemical industry and serving in the armed forces, Mr. Doig returned to St. Lawrence University for his M.S. in 1949. He has been associated with Shulton, Inc., for the past six years, carrying on organic synthetics research. Mr. Doig is a member of the American Chemical Society.

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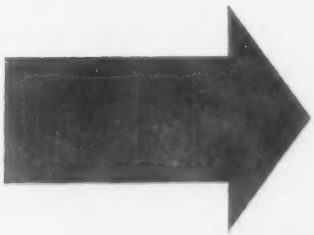

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Canadian News

J. W. Murphy, Conservative Member of Parliament for Lambton West, speaking recently before the Canadian House of Commons, challenged the view of a former CCF member that the Canadian Government should dispose of all crown assets and crown companies, including Sarnia's Polymer Corp. The Lambton MP calling for the retention of Polymer as a crown company, said he saw no reason why Canadian industry should provide "a luscious melon" to satisfy the hungry taste buds of foreign investment-seekers. Polymer, he said, must continue to have the right to live as a prosperous Canadian industry owned and controlled by Canadians.

At the same time, Mr. Murphy suggested that the officials of the Polymer Corp. should appear before a parliamentary committee to give an accounting of their stewardship. He thought they would be pleased to appear to relate Polymer's success story.

The Member of Parliament said that while he believed in free enterprise, he believed as well that private enterprise and public ownership jointly could contribute to the country's economic development. Polymer was not in competition with any other industry in Canada. Today it was Sarnia's largest employer of labor, its 2,453 employees receiving a payroll of $9,790,669, annually.

For the academic year starting September, 1956, seventeen fellowships totalling $32,500 have been authorized by Canadian Industries, Ltd., to be awarded to qualifying students for postgraduate research in chemistry. Two categories of fellowships will be available again, the first valued at $2,000 for research by qualified students working for their doctorate degree; the second at $1,500 for research by qualified students working for their master's degree.

Fellowships for students studying for their master's degree will be available at the University of Alberta, Dalhousie University and the Ontario Agricultural College. For students proceeding to their doctorate degree, fellowships will be available at the following universities: University of British Columbia, Laval University, Macdonald College, University of Manitoba, McGill University (2), McMaster University, University of Montreal, University of Ottawa, Queen's University, University of Saskatchewan, University of Toronto (2) and the University of Western Ontario.

H. Morris Gard, former employee of C-I-L who retired recently after 30 years service and who is in the University Hospital in Edmonton, Alberta, has recently been elected a Fellow of the Royal Institute of Chemistry, London, England. Mr. Gard was graduated from Durham University, England, in 1923 with a B.Sc. in chemistry and joined Canadian Industries, Ltd., the same year as a works chemist at the company's Windsor works. He was subsequently appointed chief chemist at Windsor and, in 1954, was transferred to Toronto as technical assistant at the Toronto chemical filling station and warehouse. Mr. Gard was on loan to the Western Chemical Co. at Two Hills, Alberta, as a technical assistant, when two weeks before his scheduled retirement in October, he was injured in an automobile accident.

Rapidly increasing markets, combined with increasing importance of non-tire products in the company's sales program has made necessary the creation of two separate sales divisions, it has been announced by C. B. Cooper, general sales manager of the Goodyear Tire & Rubber Co., Ltd. F. G. Willmot has been appointed sales manager of the new General Products Division covering industrial rubber products, Airfoam and special products, shoe products and molded and extruded rubber goods. With the company since 1925, Mr. Willmot has served as manager of the service, automobile tire, dealer development and tire sales departments, and assistant general sales manager.

G. F. Turner has been appointed sales manager of the new Tire Division, which also includes battery and accessory sales, service department and dealer development. Mr. Turner joined Goodyear in 1929 and has held a number of important positions in branch and head office sales.

The Crown-owned Polymer Corp. at Sarnia plans a $5,650,000 program of new capital works in 1956, the government reported in January. An additional $4,207,000 in outstanding capital commitments at the start of the year was also shown in the corporation's capital budget tabled in the House of Commons. The budget was approved by the Canadian Cabinet on January 11th.

New capital expenditures included $3,000,000 for a new butadiene unit, $600,000 for the third stage of a major increase in butadiene rubber production and $1,910,000 for improvements and alterations to the present plant. Outstanding capital commitments at the start of the year included $2,339,000 for the first and second stages of the expansion program in rubber output and $99,000 for improvements to existing production units.

The Seventh Canadian High Polymer Forum will be held at the Guildwood Inn, Sarnia, Ontario, Canada, November 8 and 9, 1956. The Forum is co-sponsored by the National Research Council of Canada and the Chemical Institute of Canada and is devoted to all aspects of polymer science.

Authors of papers are requested to notify the program chairman, Dr. D. G. Ivey, Department of Physics, University of Toronto, Toronto 5, Ontario, giving title and authors. Abstracts and final titles will be required by August 31, 1956. In addition, to contributed papers, there will be the forum banquet and dinner, Thursday, November 8. Chairman of the Seventh Canadian High Polymer Forum is Dr. H. Leverne Williams, Polymer Corp., Ltd., Sarnia, Ont.

The rubber footwear business of B. F. Goodrich Canada, Ltd., will be suspended as soon as present inventories are sold, it was announced on January 30. Ira G. Needles, president, said the increasing volume of low-labor-cost imported rubber footwear reaching the Canadian market is causing the thirty-year-old business to shut down. Imports of rubber-soled canvas shoes, chiefly made in Hong Kong at coolie-wage levels, had drained away more than half of the domestic demand, he asserted. "We will continue to market our plastic footwear and will study the possibilities of producing additional plastic items," Mr. Needles said.

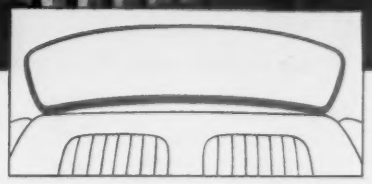
An agency known as the Canadian Rubber Footwear Information Office has been formed. The agency office at 60 St. Clair Ave. West, Toronto, will act as a central and authoritative source of information relative to Canadian rubber footwear. Chairman of the information office will be H. J. Ross, president, United Rubber Ltd., Toronto. Harry Wolfhard, vice-president and general manager, Footwear and General Products Division, Dominion Rubber Co. Ltd., Montreal, will be vice-chairman.

M. O. Simpson, chairman, Gutta Percha & Rubber Ltd., has announced that J. Ross Belton has requested to be relieved of the responsibilities as the firm's president, effective March 31st, 1956. Mr. Belton will continue as a director of the company and in an advisory capacity to the company's management. Mr. Belton is also a director of Combined Enterprises Ltd., the parent company. Mr. Belton joined Gutta Percha in 1921, and has completed 35 years of continuous service with the company, during which period he rose from junior engineer to the senior executive position.

Naugatuck Chemical Expanding

Naugatuck Chemical Division of the U. S. Rubber Co., Naugatuck, Conn., has acquired a 150-acre tract of land in the Scott's Bluff region of Baton Rouge, La., on which it plans to construct a new chemical plant for the manufacture of "Kralastic" plastic materials used for pipe, automotive parts and a variety of industrial products. "We expect our total investment in this new plant will be more than five million dollars and it will more than double production capacity for these fast growing plastic materials," John E. Caskey, vice-president of U. S. Rubber and general manager of the Naugatuck Chemical Division, said. "Construction will start immediately and the new plant is expected to be completed by July, 1957". Kralastic is a copolymer based on styrene, butadiene and acrylonitrile. Chemically resistant pipe is its largest single use today.

Like to make a suggestion to the industry? Write a letter to the editor! (See page 654).



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Obituaries

Horatio M. Adams

Horatio M. Adams, who with his father and elder brother helped introduce chewing gum in the United States, died on January 27 at his home in Somerville, N. J. Mr. Adams, retired vice-president of the American Chicle Co., was 102 years old. It was with his father, Thomas Adams, that he pioneered in the introduction of chicle to this country as a base for chewing gum. Their experiments led to the establishment of Adams & Sons, which later was merged with other firms to become the American Chicle Co. Horatio Adams was born in Fishkill, N. Y. His brother, Thomas, Jr., eight years his senior, began experimenting with chicle, his purpose being to turn it into a commercial rubber. Failing in that endeavor, he decided to use it after the fashion of the Mexicans, in the manufacture of chewing gum. In 1869, he persuaded his father to set up the chewing gum manufacturing business in Jersey City, N. J. Both sons entered the business, of which Thomas Adams, Sr., was the first president. Horatio Adams became a vice-president of the company in 1888. In 1899 the company was merged with a number of others to become American Chicle. Horatio Adams retired in 1902 but retained a directorship in American Chicle until about 20 years ago. He leaves his wife, a son, and two daughters, all children being by a former marriage.

William Y. Duncan, Jr.

Captain William Y. Duncan, Jr., U.S.N.R., Ret., died at his home in New Haven, Conn., on December 12 after a long illness. Captain Duncan, during the period between World Wars I and II was an executive of the Akron Standard Mold Co., Akron, Ohio. Born in Overbrook, Penna., on December 17, 1890, Captain Duncan entered the U. S. Navy in 1917. He was a graduate of the U. S. Navy Ordnance School and the Naval Mine Warfare School. He was also a graduate of Williamson Technical School of Philadelphia, Penna. Captain Duncan's final assignment in World War II was as commander of the Naval Ammunition Depot on the island of Guam. A full military burial service was held at Arlington National Cemetery, Arlington, Va., on December 14. He is survived by his wife and a son.

Carl G. Knarzer

Carl G. Knarzer, assistant general traffic manager for the U. S. Rubber Co., New York, N. Y., died suddenly on December 30, 1955, while returning to his home from work. He started with U. S. Rubber in 1930 in the Indianapolis, Ind., plant, and was assigned to the New York general offices in May, 1943. He was a member of the company's 25-Year Club. Funeral services were held on January 3 with interment at Calvary Cemetery, Paterson, N. J. He is survived by his wife and three daughters.

Gerald Haywood

Dr. Gerald Haywood, technical assistant to the manager of technical research and development for the West Virginia Pulp and Paper Co., and one of the nation's leading authorities on cellulose chemistry, died on January 8 at the Potomac Valley Hospital, Keyser, West Va., after a brief illness. He was 59 years old. Active in the company's research and development program for more than 40 years, Dr. Haywood held a number of important patents in the field of pulp and paper manufacture. His outstanding contributions were in the development of machine coating of paper and the use of pigments in paper fillers and coating formulations. He was a member of the Fundamental Research Committee and the Coding Committee of the Technical Association of the Pulp and Paper Industry. He was also a member of the American Chemical Society and the American Association for the Advancement of Science. He is survived by his wife and five sons.

C. Joseph Fouche

C. Joseph Fouche, retired manager of the Service Sales Department of the General Tire & Rubber Co., died on December 28, 1955, in St. Petersburg, Fla., after a long illness. He was 73 years old. Mr. Fouche had served more than 30 years at General Tire when he retired in 1951. For a short time in 1952 he served as a rubber consultant with the U. S. Army Ordnance Department. Later, he moved from Akron to Florida. His education was in music, and Mr. Fouche was widely known in the Akron area for his musical activities. Mr. Fouche was a graduate of the New England Conservatory of Music and had taken additional music courses at New York University. He leaves his wife, three sons and two daughters. One of his sons, John, is assistant general sales manager of the Seiberling Rubber Co.

Frank H. Jennings

Frank Howard Jennings, one of the founders of the McNeil Machine & Engineering Co., Akron, Ohio, died on January 26 in Akron General Hospital as a result of injuries sustained in an automobile accident the same day. He was 61 years old. Mr. Jennings, the father of nine children ranging from 35 years to nine months of age, was one of the five original owners of McNeil Machine as it is organized now. Until a few years ago, Mr. Jennings was assistant secretary, assistant treasurer and a director. He retired from active participation from the firm, but remained on the board of directors. He was a major stockholder in the company. Married three times, Mr. Jennings leaves his wife and nine-month old daughter; three children by his second marriage and five children by his first marriage.

S. D. Douglas

S. D. Douglas, who only recently was promoted to senior scientist in the Research Department of the Carbide and Carbon Chemicals Co., New York, N. Y., died at Houston, Texas, on January 15. Dr. Douglas was one of the foremost research scientists in the field of plastics, particularly, vinyl resins. He joined Carbide and Carbon in 1926 after being graduated from Middlebury College and after receiving his M.S. and Ph.D. degrees in chemistry from the University of Pennsylvania. In 1944, he was appointed assistant director of research for the company. The nation's most distinguished award for achievement in the plastics industry, the John Wesley Hyatt gold medal, was awarded to Dr. Douglas in 1944 for his outstanding accomplishments. He was a member of the American Chemical Society, the Society of the Plastics Industry, and the Society of Plastics Engineers.

R. Kirby Shirley

R. Kirby Shirley, senior vice-president of the Freeport Sulphur Co., New York, N. Y., died on January 24 in New York Hospital. He was 56 years old. Mr. Shirley was also a member of the board of directors of the company, with which he had been associated since 1920. He was named assistant vice-president and controller of the company in 1930. Four years later, he was elected treasurer, and retained this title when he was promoted to vice-president in 1940. He was elected executive vice-president and a director in 1948. Mr. Shirley was named senior vice-president last October. Between 1950 and 1955, he helped develop four new sulfur deposits in the Gulf Coast region. He is survived by his wife, two daughters and a son.

H. A. Flannery

H. A. "Mike" Flannery, manager of engineering for the Goodyear Tire & Rubber Co., Akron, Ohio, died on January 28 in Akron General Hospital after being stricken by a heart attack. He was 61 years old. During World War II, Mr. Flannery was responsible for the construction and engineering of factories and machinery needed by Goodyear to switch from civilian to war production for the government. He had directed the spending of millions of dollars, and at the time of his death was in the middle of a $114,000,000 expansion program. He is survived by his wife and son.

George Oenslager

As this issue went to press it was learned that Dr. George Oenslager, noted research chemist formerly associated with the B. F. Goodrich Co., died of a heart attack on February 5 while aboard the Italian liner Conte Biancamano. He was 82 years old. Winner of the Goodyear Medal in 1948, Dr. Oenslager was credited with having developed processes that greatly reduced the prices and increased the life of tires and other rubber products. A complete obituary on Dr. Oenslager will appear in our next issue.

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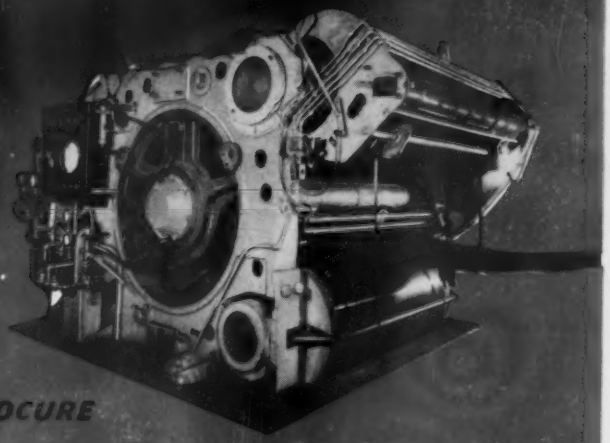

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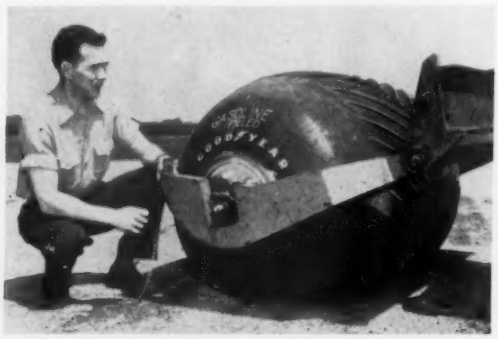
New Goods

Goodyear Rolli-Tanker

A watermelon-shaped rubber tank has been developed by the Aviation Products Division of the Goodyear Tire & Rubber Co., Akron, Ohio, for the bulk transportation and storage of fuels and other liquids. Called the "Rolli-Tanker," the container can be rolled over ground, floated in water and dropped without bursting. Rolli-Tankers are unconventionally-shaped tires of nylon cord and tread stock constructed with fuel-proof inner lining. They can be built in a range of sizes. To date,



the company has tested 3½ by 5-foot tanks that weigh 40 pounds deflated and give the appearance of oversized watermelons when loaded to 250-gallon capacity. Mounted on hubs and axles to permit easy handling, Rolli-Tankers may be towed manually or by vehicle. The containers have excellent flotation characteristics because of extremely low ground-bearing pressure. Only 30 pounds of drawbar pull—easily supplied by one man—are needed to roll the storage units.

Filled Rolli-Tankers can be towed either singly or in tandem arrangements behind any vehicle equipped with a trailer hitch without affecting the vehicle's gross weight. Low footprint pressures permit them to be easily drawn over unprepared surfaces, such as rocky, uneven terrain, swampy soil and sandy areas. The pliable construction of the tankers conform to the shape of obstacles over which they pass. Rolli-Tankers are said to have a natural buoyancy, and can be floated down rivers and across lakes when filled properly. During recent tests conducted by the company, fully-loaded units were dropped fifteen feet without bursting, giving preliminary indication that Rolli-Tankers may be suitable for parachute or free-fall droppable containers.

Ti-Not Elastic Fastener

Ti-Not Co., 7209 W. 65th., Overland Park, Kansas, has introduced the "Ti-Not Elastic Fastener," a new rubber unit which finds use in tying bunches of vegetables together; in closing plastic bags, or in securing a "pony-tail" hairdo. The unit resembles a heavy rubber band with a knob or hook, also of rubber, at one end. When the end of the unit is slipped around the knob, secure fastening is accomplished. The new fasteners are available in sizes ranging from 1¼ to 3½" long in red or black. The black bands are slightly heavier and more durable for outdoor exposure.

Announcing the 1955-56 Edition of the

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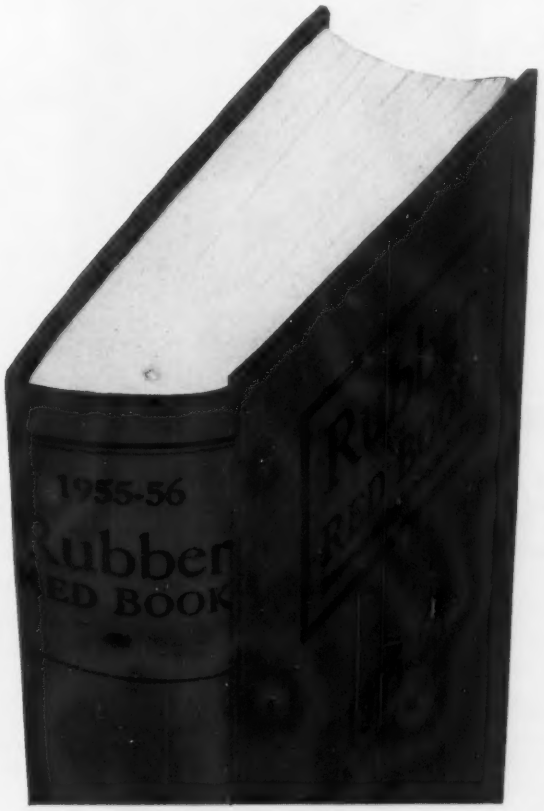

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III. WHO'S WHO—*the* complete listing of all persons in the rubber industry together with their company connections, title and full address.

Other sections offer valuable information on consulting technologists, sales agents and branch offices, educational courses in rubber chemistry and technology now being offered, technical journals, trade and technical organizations, and much more.

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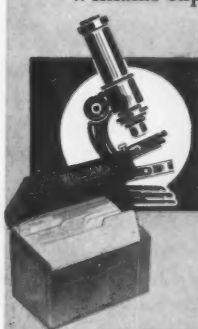

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Miruco Plumbing Device

Midwest Rubber Company of East Detroit, Mich., has announced the development of a new household plumbing device called the "Miruco Jet Flush". The unit is designed and produced to solve the frequent plumbing problem of sewer and toilet drain stoppages. The new device, which is made of neoprene and equipped with high quality brass fittings, has been designed to attach to an ordinary garden hose. In operation, the flexible neoprene fluted bag is rigid enough

to retain its shape when inserted in sewer drain opening or toilet bowl drain, allowing for simple and proper positioning of the unit near the area of congestion and stoppage. The unit is equipped with an adjustable nozzle so that variance in water pressure can be compensated for.

When the unit has been inserted in the sewer pipe or toilet drain where an obstruction exists and the water has been turned on, the fluted neoprene bag swells to seal against the walls of the pipe or drain. Next, water pressures which build up between the seated unit and the obstruction force the break-up and removal of the obstruction with piston-like water forces. The accompanying photograph shows (top) the unit in a sewer pipe before the water has been turned on; (middle), the unit swells to seal the pipe and water forces begin to work on the obstruction; (bottom), water forces are shown breaking up the obstruction matter flushing the pipe clean.

Rema T.T. Tire Repair Kit

A new, quick and simple cold vulcanizing tubeless tire repair unit which permits the repair of punctures without removing the tire from the rim has been introduced by Remaco, Inc., 11 Park Place, New York 7, N. Y. The new kit makes possible the permanent repair of punctures of passenger car and truck tubeless tires up to a diameter of 5/8-inch within less than five minutes, the company states. The kit consists of cone-headed rubber plugs, each compressed into metal guide shafts which are introduced into the puncture hole from the outside by means of a special tool.

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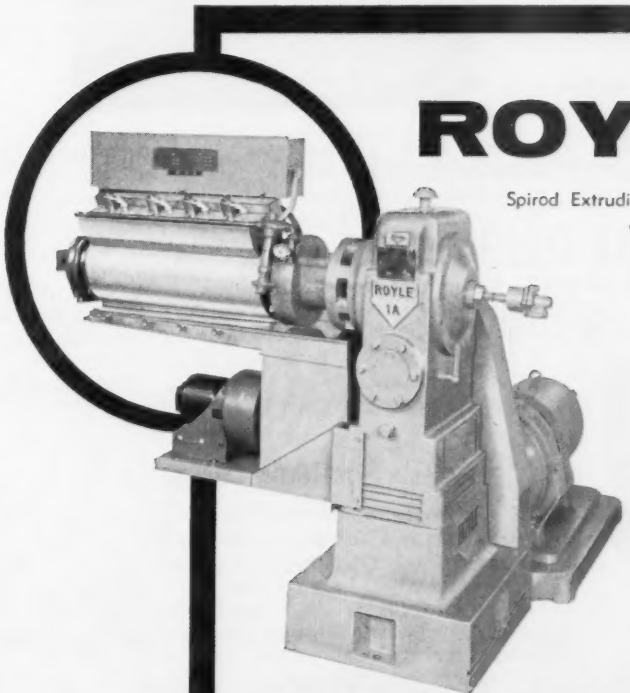

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Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

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As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.

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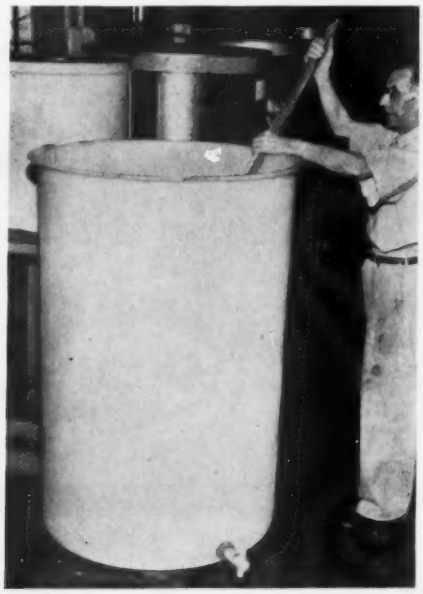
Molded Polyethylene Tanks

New low-cost chemical tanks with capacities of 5 up to 160 gallons are now being molded of Bakelite polyethylene by the Delaware Barrel & Drum Co., Inc., Wilmington, Del. The tanks are molded in one continuous piece to prevent leaks and corrosion. The nonbreakable walls of the tanks are translucent enough to reveal the level of the liquids inside. These tanks have wide use for mixing, storage, compounding and processing of foods, pharmaceuticals, salts, water softeners, and cleaning and plating of metal. The resistance of the polyethylene to corrosion by most chemicals enables the use of the tanks to hold caustics, strong or weak acids, etc. A huge 160-gallon tank, as seen in the accompanying photograph, finds use in the mixing of fine pharmaceuticals. An outlay valve at the base of this large tank is also made of polyethylene. Smaller size tanks are finding use in residential and industrial water treatment. Low cost tanks in sizes anywhere from 5 to 160 gallons capacity are available in cylindrical, cubical or rectangular shapes, together with covers.



Super-Master BW Hose

A new, high visibility hose of braided wire construction for extra safety at pressures to 2000 psi has been announced by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. Strong enough for air actuating service on the heaviest machinery and loading equipment, the new hose is light and flexible enough for pneumatic tools. It is built with special steel braids that offer maximum resistance to accidental crushing in mine and quarry service. In addition, a neoprene tube that withstands hot oil from compressors, and a bright yellow cut-resistant cover provides maximum visibility and hose life. The hose is sold under the trade names "Super-Master BW Air" and "Super-Master BW Water."

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NEOPRENE WHV	**SUNDEX-53**	**Highly Extended,** Neoprene WHV compounds can be made for prices comparable with those of low-cost elastomers.
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To learn more about using Sun Rubber Process Aids to get better physicals, lower costs, and easier processing, see your Sun representative. Or write for your copy of Sun's latest Technical Bulletin describing any of the above products. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept RA-2.

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Skotch O'Matic Insulated Jug

Hamilton Metal Products Co., Hamilton, Ohio, has introduced the "Skotch O'Matic," an insulated jug with a built-in pump dispenser. The new product, marketed in one-half and one gallon sizes, entirely eliminates the need for lifting, tilting or pouring, and is said to improve greatly on the so-called spigot jug that operates

through the bottom on gravity flow only. With the Skotch O'Matic, the rubber bulb at the top is squeezed and the liquid is pumped through a spout at the top. The unit also features a removable magnetic stopper which fits into the spout. When drinks are requested, the stopper is removed and can be placed against the container's metal surface, where it sticks.

New Bowling Ball Grip

A new grip for bowling balls which is said to provide traction action for fingertip control has been introduced by the Fawick Flexi-Grip Co., Copley Road, Akron 20, Ohio. The manufacturer claims that the grips give the bowler extreme finesse for better hooks and also make for easier, smoother lift of the ball. Called the "Bowler's Price Grip," the unit consists of an adhesive-backed thin strip of rubber, 2 inches long and ¾-inch wide. It is slipped inside the holes of the ball and affixed with normal finger pressure. The texture of the material and striations on the face of the grip, positioned to the fingertips, provide the traction action which is supposed to account for improved scoring.

Veri-Lite Garden Hose

Boston Woven Hose & Rubber Co., Boston 3, Mass., has announced the addition of a lightweight, rubber garden hose to its line. A specially selected, durable, synthetic yarn is woven into the carcass for extra strength. This reinforcement permits lighter wall construction which results in a garden hose which can be handled with ease. The new hose, called "Veri-Lite," employs a superior rubber which assures maximum flexibility plus weather and wear resistance. It won't stiffen in cold weather or burst under the hot sun. Solid brass, full-flow couplings permit a continuous stream of water through the full half-inch inside diameter of the hose. The new hose is available in red or green.

NEW BLASTING GRIT

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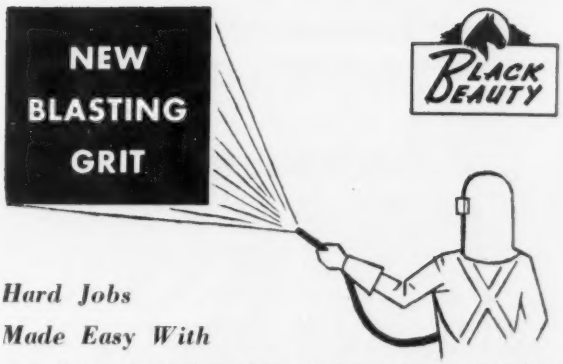

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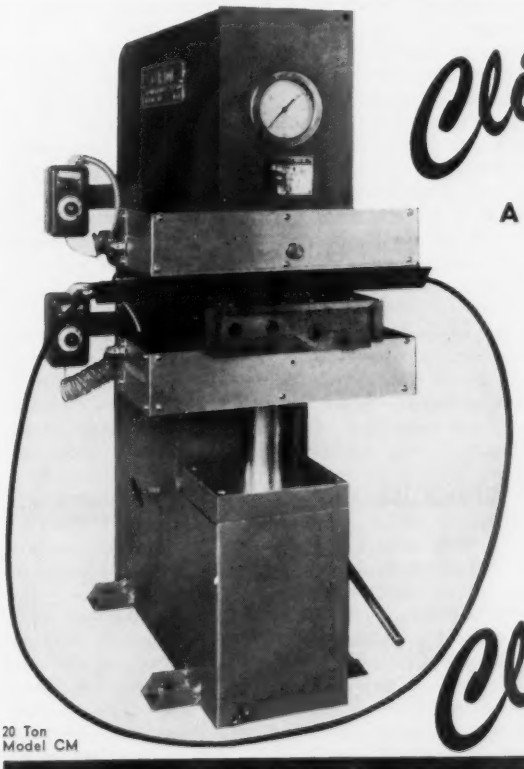

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Pumping Progress Report

FOR CHEMICAL ENGINEERS

An advertisement prepared by The Aldrich Pump Co., Member of Hydraulic Institute, U.S.A.

SPACE, in many pump installations, is a major problem. Another is the necessity for special foundations. For new installations these factors may dictate elaborate construction; for replacement or modifications of existing systems, expensive piping and equipment changes.

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SIMPLICITY OF DESIGN brought about the first Inverted Triplex and Quintuplex and ultimately Septuplex and Nonuplex Pumps. This Aldrich design innovation brought to users economies of space, maintenance and operation they had never known. And even more important, Multiplex pumps brought new freedom from pulsation.

INVERTED PUMP DESIGN permits the use of less expensive foundations. With the crankshaft located near the floor there is no need to raise the driver or lower the pump. Then, too, inverted pumps require fewer square feet of floor space than conventional pumps.

MAINTENANCE COSTS ARE REDUCED. Fluid-end, where most work is done, is at chest level. Sectionalization, another Aldrich innovation, and parts standardization permit ease and economy of inspection or replacement.

TELL US ABOUT YOUR PUMPING PROBLEM. The chances are that one of our standard pumps — or a modification — will do your job. Detail your problem and we'll send you our Data Sheet describing the Direct Flow Pump we recommend. Write to: The Aldrich Pump Company, 25 Gordon Street, Allentown, Pa.

New Equipment

Alden 30-Channel Recorder

A new channel recorder that is said to have a capacity for monitoring the operation of up to 30 machines simultaneously, giving an instantaneous and permanent record of their operation, cycle, and down time, has been developed by the Alden Electronic & Impulse Recording Equipment Co., Westboro, Mass. The 30-channel recorder makes it possible for anyone wishing to monitor any type of operation to remain at his desk

and be instantly informed of the action being monitored as it occurs.

The unit employs a new electrosensitive paper, which uses electricity as the ink, making it possible to pass current from a styli through the paper and make a mark. When the electricity flows, there is a mark. When there is no electricity, no mark is recorded. This paper opened up the possibility of designing sturdy, lightweight recorders which merely has paper moving by these styli. Current to activate the styli is picked up by tiny switches mounted on machines or equipment where a record of activity is needed. The switches are activated by motions of the machine or equipment.

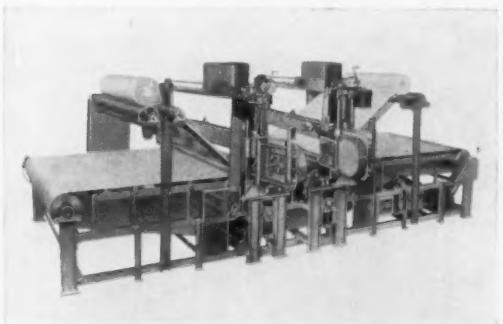
Installation of the recorder is simple. Switches are attached by bolt, thumbtack, tape, or just slipped onto the machine, drawer, door, or whatever is being monitored. From this switch a line is run to the recorder. To begin the operation a push-on, push-off button is pressed and recording will commence. The recorder can be operated unattended. Two fixed speeds—slow and fast—permit the unit to be driven at any speed desired. In addition to the electrodes, the machine contains a paper supply and a paper feed which is usually driven by a synchronous motor in order to provide a time base. All elements are plug-in unit constructed, easy to adjust and maintain.

Two models of the recorder are available—Type 230A-6 with a speed of one and six inches of tape per minute and Type 230A-12 with a speed of one and twelve inches of tape per minute. The company's standard power supply, Type 730-1A, is available as a separate unit as well as a power supply with channel-indicating lights, Type 740-1A. Motion switches, either normally open or closed, with extension cables and plugs, make possible an entire set-up to monitor almost any type of activity.

Falls Polyurethane Slab Cutter

A new conveyorized double-head polyurethane slab cutter built by Falls Engineering & Machine Co. of Cuyahoga Falls, Ohio, is said to convert huge slabs of polyurethane to sheets and rolls for easy shipping and fabricating. The machine is intended for manufacturers who now produce polyurethane in bulky slabs which are difficult to ship to fabricators.

A conveyor belt 84 inches wide feeds the big slabs



of polyurethane to two vertically adjustable splitting heads which face each other in the center of a 14 foot conveyor. These splitting heads automatically adjust themselves to meet the stock as it moves back and forth on the conveyor belt. They split the stock to a pre-determined thickness, $\frac{1}{16}$th of an inch or more. As each cut is made the split sheet is conveyed to one of two roll-up units. This process of splitting quickly reduces a huge slab of polyurethane into sheets with only the bottom skin remaining of the original slab.

In tests made at the Falls Engineering plant this machine has successfully split polyurethane stocks as thin as $\frac{1}{16}$-inch and converted it into rolls. Falls Engineering officials say the machine will handle blocks of polyurethane 25 feet in length and longer when roller conveyors are placed at each end of the conveyor belt. Slab stock moves along the conveyor at a speed which can be varied from 13 to 60 feet per minute.

Joy Cable Vulcanizer

A new electrically-operated cable vulcanizer, reported to weigh 16 pounds, less molds, has been developed by the Joy Manufacturing Co., Henry W. Oliver Bldg., Pittsburgh 22, Penna. The new unit is capable of making repairs on cable up through two inches in diameter. Available for use on standard A.C. and D.C. voltages with a wattage rating of 1000, the new units are designed to make quick "on the job" jacket repairs or to completely replace insulation and jacketing when splices are required. Heat from two 500 watt "cast in" electrical heater units (one located in each half of molding jaw) is applied directly through molds to the work. Pilot lights indicate when current is on, and at start of operation, signal completion of warm-up period by going out. Correct molding temperature is maintained by a regulator unit located under the cover. The unit is preset at the factory for natural rubber, synthetic rubbers or for thermoplastic cable as specified. Aluminum molds for use with these vulcanizers have been developed to cover most standard and many special types of cord and cable.

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find ready acceptance

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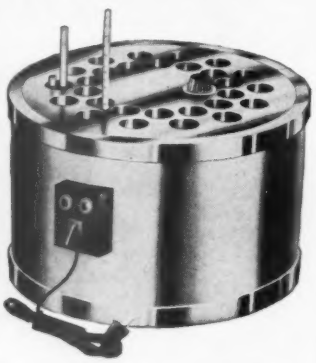
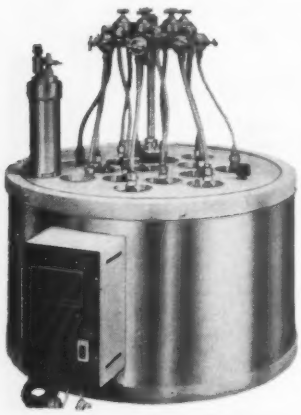


for immersion and other tests at 0 pressure.

In 18 months
from June 1954 — December 1955
52 SOLD
20% RE-ORDERS

42 rubber and plastics firms ordered 52 LG's in 18 months, a record time for a new tester to become so firmly established.



SCOTT TESTER* LGP

for oxygen and air ageing tests under pressure.

In 6 months
8 USERS

Following in the steps of its proven predecessor, our Block Oven for pressure testing is rapidly winning Industry acceptance by dependable performance and the far-reaching usefulness of its tests.

Request Literature

What is YOUR problem?
Your Testing Problem is Our Business.
Why not put our 57 years of know-how at work on your problems?

*Trademark

SCOTT TESTERS, INC.
85 Blackstone St., Providence, R. I.

Standard of the World

Blue M Industrial Batch Oven

A new Power-O-Matic control system is now available as standard equipment on a line of industrial batch ovens manufactured by the Blue M Electric Co., 138th and Chatham St., Blue Island, Ill. It is said that this new control system automatically proportions wattage in direct relation to operating temperature and work load resulting in straight line control throughout entire oven range. Maximum wattage is used only on initial run-up.

When set temperature is reached, Power-O-Matic goes into action and minimum wattage is automatically modulated in relation to temperature and work load rather than cycling a fixed wattage "on" and "off."

The opening of doors for inspection, loading and unloading of work parts causes immediate automatic energization of full 100% Modella heater elements. Recovery time is shortened and preset temperature stabilization is rapid. A 24 volt control circuit, according to the company, is a decided factor in longer life of contacts and results in a far more sensitive temperature control response.

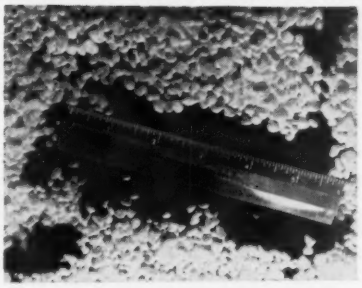
The company's line of batch ovens are triple side wall constructed of heavy gauge steel with four inches of fiberglas insulation and blow-out relief panel. They have a temperature range from 100°F. to 600°F. The ovens are manufactured in five sizes from 16 to 96 cubic feet. Other features of the oven include a large motor, an extended shaft, vee belt design and air flow convected horizontally by a centrifugal blower. Standard voltages of 220 volts or 440 volts, three phase 60°C. A.C. are available.

A new bimetallic dial thermometer designed for a wide variety of applications has been announced by the Taylor Instrument Companies, Rochester, N.Y. Called the **Bitherm dial thermometer,** it is offered for such industrial and institutional service as pipe lines, hot water tanks, storage tanks, ovens, air ducts, bottle washers and many others. The instrument is said to be accurate within plus or minus one percent of range over the entire range. It is available with three or five inch dials and stem lengths of four, six, nine and 12 inches.

To Eliminate Dust and Cut Costs

IN NEOPRENE COMPOUNDING

Use DCI
"Tested and Proved"
GRANULAR LIGHT CALCINED MAGNESIA



Here is magnesia of the highest quality in granular form —practically dust-free. Each particle is uniform in crystal structure and chemical content. Strict manufacturing standards and quality control are your assurance of the cleanest and finest magnesia with low iron, calcium and manganese oxides content.

Additionally, protective packaging seals out dust and moisture. All of this means you get the important qualities in magnesia for neoprene compounding without paying a premium. Ask for a sample today. Test and you'll know. Write:

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1420 Walnut Street, Philadelphia 2, Pa.

Represented by:
Summit Chemical Co., Akron, Ohio
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They'll Quickly Pay for Themselves ...IN YOUR PLANT

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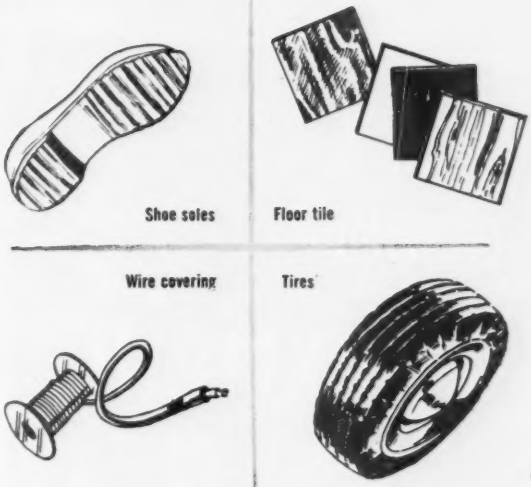
Stanley H. **HOLMES** Company
Hydraulic Presses Since 1901
3300 W. Lake St. Chicago 24, Ill.

PANAREZ

HYDROCARBON RESINS

improve products like these:



If you compound rubber it will pay you to investigate *low cost* PANAREZ hydrocarbon resins. These softeners are available in any color from Barrett No. 1 to 18, and softening point from 40° F to 300° F. They are supplied in flaked or solid form.

Compounds containing Panarez resins show **IMPROVED COLOR AND COLOR STABILITY . . . IMPROVED EXTRUDABILITY . . . IMPROVED FLEX CRACK PERFORMANCE and ABRASION RESISTANCE . . . IMPROVED OZONE RESISTANCE . . . IMPROVED TEAR RESISTANCE, TENSILE STRENGTH and ELONGATION.**

No change in compounding technique is required when switching to Panarez resins.

For confidential information about how these low cost resins might be helpful in your business, write us, telling the intended application.

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PAN AMERICAN CHEMICALS CORP

555 FIFTH AVENUE, NEW YORK 17, N.Y.

HYDROCARBON PANAREZ RESINS

PANAPOL Hydrocarbon drying oils

PANASOL Aromatic solvents

REDUCE YOUR
plasticizer
COSTS

in low temperature
compounds with

ECONOMICAL, EFFICIENT
flexricin®
P-4

Priced under 35¢ per lb., Flexricin P-4 combines low cost with a performance fully equivalent to the more commonly used higher priced plasticizers. By imparting outstanding flexibility at temperatures as low as −80°F, minimum swell in oils and aromatic fuels, marked ozone resistance and excellent recovery on low temperature compression set, Flexricin P-4 is the lowest cost plasticizer that can be *successfully* used in low temperature stocks meeting specifications such as MIL-R-6855. Join the many satisfied users who have found Flexricin P-4 the way to reduce plasticizer costs without sacrificing performance.

For samples and literature of these and other Baker products for the rubber industry, write

Looking for
PROCESSING AIDS
that impart oil and solvent resistance?
USE
POLYCIN® for general milling
CASTORWAX® for extrusion and molding

THE Baker CASTOR OIL COMPANY
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Reviews

BOOKS

Successful Production Planning and Control: From Forecast to Final Delivery. (Special Report No. 5). Published by the American Management Association, 1515 Broadway, New York 36, N. Y. 6¼ x 9¼ in. 216 pp. $5.50.

J. Keith Louden, vice-president, Commercial Division, York Corp., in his introduction to this book states that "the successful company will be the one that thinks out carefully where it wants to go, why it wants to go there, how it can get there, and when it should get there—and then sets about doing so with a minimum of dislocation and mishap." This statement aptly summarizes the contents of this special report. The book deals with the principles of planning and controlling production and the special tools and techniques which have proved themselves in a variety of industries. Most of the report is based on paper and supplementary material prepared for the special conference on production forecasting, planning, and control held by the American Management Association's Manufacturing Division at the Hotel Commodore, New York City, June 13-14, 1955. Also included in the publication are papers written specifically for this volume or adapted from other AMA publications. The book is divided into four sections and treats on such subjects as: (1) Organizing for maximum results; (2) Factors in a successful program; (3) Contributing groups and individuals, and (4) Company programs and approaches.

■

Getting the Most from Product Research and Development. (Special Report No. 6). Published by the American Management Association, 1515 Broadway, New York 36, N. Y. 6 x 9 in. 156 pp. $3.75.

There are a variety of ways in which research and development contributes to corporate growth. The most obvious involve new products, new cost-saving production processes, product improvement, and the utilization of by-products. This growing research activity has necessitated organizing the effort of large numbers of scientists and technicians. Professional and scientific meetings and publications of high caliber constantly explore the technical aspects of research and development. But the management of this function—especially the crucial areas of organization and financial planning and control—has not had similar attention. This report—and the conference at which the various papers were presented—is a beginning effort by the American Management Association to make available the best management experience and findings for all to evaluate in terms of their own situation. Included in the report are such papers as "The Air Force Research and Development Program;" "Progress Through Coordinated Effort;" "Developing Professional and Managerial Talent," and "Problems in Programming and Scheduling."

■

Determination of the Shear Stability of Non-Newtonian Liquids. Prepared by Neal D. Lawson. (ASTM Special Technical Publication No. 182). Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 20 pp. 75c.

This publication will be of value to those concerned with development or use of polymer liquids and of mechanical devices in which those liquids are used. It describes several test procedures which are capable of giving comparable results. It reports the data from a cooperative effort to develop a suitable test method for measuring shear stability of non-Newtonian liquids. The test methods studied included sonic vibrators, sharp-edged orifices, flow through a diesel fuel injector, and a pressure release valve. The two test liquids were made by blending polyalkyl methacrylate polymers with a light petroleum base oil. Since the shear stability equipment subjected the oils to different rates of shear or severity, a direct comparison of the methods is not obvious. However, a comparison under conditions of equal severity shows that they do give identical results.

BOOKLETS, CATALOGS, etc.

Progress Report on the Cooperative Hevea Rubber Development Program in Latin America. By R. D. Rands and Loren G. Polhamus. (Circular No. 976). U. S. Department of Agriculture, Washington, D. C. 6x9 in. 84 pp. 35c. (Prints available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.).

This circular presents a 14-year summary of major activities and results from the cooperative research and development program designed to establish a rubber-producing industry in nine Latin-American republics—Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Guatemala, Haiti, Mexico, and Peru. From its beginning in 1940, this program constituted the pioneer foreign technical-assistance project in the field of agriculture. The circular states that the United States objective is to create a "living" stockpile within the U. S. defense zone that may eventually reduce or eliminate the government's costly strategic stockpile of Far Eastern rubber stored within the country. Latin American objectives, according to the circular, are principally (1) self-sufficiency of rubber for internal consumption, and (2) to grow rubber as a cash crop on the undeveloped lowlands by colonists and settlers from the overcrowded highlands. In addition, an outline of the United States Department of Agriculture participation in the cooperative program is shown. This participation has consisted in the establishment and maintenance of regional field stations in Costa Rica, Guatemala, and Haiti, respectively, for basic research, breeding, and disease resistance testing, and assignment of specialists and experienced development advisers to cooperate with local scientists in the other six countries.

•

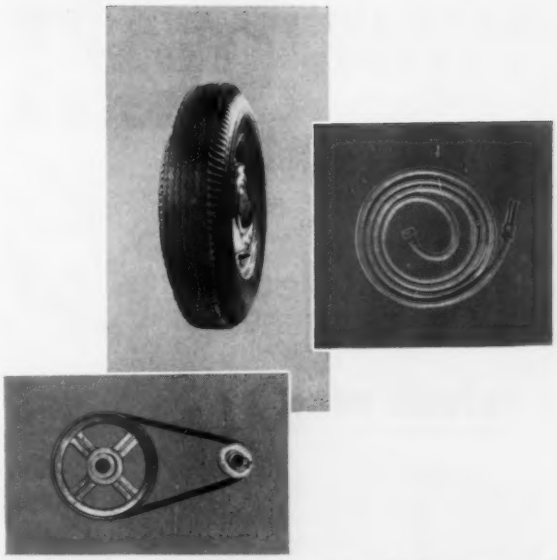
Keystone Insulated Cables. (Bulletin No. H-463). Hazard Insulated Wire Works Division, Okonite Co., Passaic, N. J. 8½ x 11 in. 52 pp.

Included in this technical bulletin are typical test results for Butyl rubber insulation under conditions of high heat and extreme moisture. Flexibility at low temperatures, moisture resistance, ozone resistance and heat resistance are checked according to IPCEA and ASTM test procedures. Also included are dimensional tables for power and control cables for direct burial and duct use as well as engineering information helpful in selecting and applying the proper cable to the specific job. Tables, formulas and graphs are given for such items as current carrying capacities; electrical formulas for determining amperes, horsepower, kilowatts and kilovolt-amperes; full-load currents of motors; d-c conductor resistances; a-c/d-c resistance ratios; voltage drop; induced shield voltage, currents and losses; short circuit currents; methods for determining conduit sizes; maximum pulling tensions; minimum bending radii, and procedure for grounding shielded cable.

•

Your Fact File on Diamond Chlorowax. Chlorinated Products Division, Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio. 8½ x 11 in. 40 pp.

Of interest to producers of rubber, plastics, paints, adhesives, mastics and fabric finishing compounds, this technical booklet describes the properties of Diamond Chlorowax products. It lists both resinous and liquid grades available, and reviews and illustrates their principal industrial applications. Supplementing this information is a series of tables covering typical characteristics and physical properties of these chlorinated paraffins, including compatibility, heat stability, specific gravity, solubility, viscosity, and miscibility. Both the resinous and liquid grades find application in rubber, the former for formulating flame-retardant stocks among other applications and the latter as non-flammable softeners which help maintain flame and chemical resistance in neoprene stocks. Both grades are compatible with neoprene, nitrile rubber, GR-S types and Butyl rubber.



IMPROVE ADHESION AND STABILITY OF YOUR DIP SOLUTIONS WITH SYNVAR RESINS

NEW LINE OF SYNVAR BONDING RESINS SOLVES LATEX DIP PROBLEMS IN TIRE AND RUBBER COATING INDUSTRIES.

■ SYNVAR can solve many of those adhesion problems constantly arising in the manufacture of rubber-fabric products. Take latex dip solutions, for example. Straight resorcinol-formaldehyde (R-F) solutions, added to the dip to improve adhesion, are usable for only 24 hours. Short life of such bonding agents results in a waste of money and time. Synvar bonding resins give latex solutions longer working life; eliminate gelling of dips.

■ SYNVAREN PLS-R is a *stopped* R-F resin that in itself is stable for a year, and for two months or more in a prepared latex dip. It fully replaces R-F solutions, giving adhesions equal to freshly prepared R-F in latex dips. SYNVAREN PLS-R is compatible with a variety of latices, is non-corrosive, and eliminates the need for handling irritating chemicals.

■ SYNVAREN 631 and SYNVARITE BRLD, the phenol-formaldehyde bonding resins for latex dips, have excellent stability. These resins give somewhat lower specific adhesion than SYNVAREN PLS-R, and are considerably lower in cost. Either resin can be used alone or in combination with SYNVAREN PLS-R to obtain balanced physical properties.

■ SYNVAR bonding resins improve the quality of your tires, belt drives, or coated fabrics. Write for SYNVAR specification bulletin No. 300 and information on complete line of rubber compounding resins.

SYNVAR RESINS

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WILMINGTON 99, DELAWARE

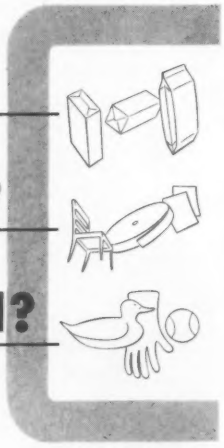
Experienced service to customers is our greatest achievement . . . customer progress and satisfaction our greatest reward.

LIKE TO CUT THE UNIT COST OF YOUR PRODUCT?

IS IT **coated?**

IS IT **heat sealed?**

IS IT **slush molded?**



THEN YOU SHOULD TALK WITH AN ARCCO ENGINEER

Unless you have talked with an ARCCO Engineer recently, you aren't up to date on the newest, most satisfactory and most economical

EMULSIONS
SOLUTIONS
HOT MELTS
PLASTISOLS

ARCCO offers you a complete compounding service. Standard ARCCO formulations cover a wide range of uses. Or, ARCCO will develop and compound modifications or special formulas tailored to your specific requirements. It will pay you to consult an ARCCO Engineer.

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RESIN EMULSIONS, SOLUTIONS AND HOT MELTS, FOR ADHESIVE BASES, BINDERS, COATINGS, SIZES AND SATURANTS.
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In Chicago: Beslac Dept., 3634 W. 38 St., Chicago 32, Ill.
In Canada: American Resinous Chemicals of Canada Ltd., 20 Trent St., Toronto, Canada

Hycar Latices in Textiles. (Service Bulletin No. H-20). B. F. Goodrich Chemical Co., 2060 East 9th St., Cleveland 15, Ohio. 8½ x 11 in. 20 pp.

The effect of dry cleaning solvents on latex films is of particular importance in the textile field. According to the National Institute of Dry Cleaning, Stoddard's Solvent, a petroleum product, is by far the most widely used, but perchlorethylene is also fairly common. To a great extent these two materials have replaced carbon tetrachloride. The data given in this bulletin shows the effect of Stoddard's Solvent, perchlorethylene and trichlorethylene on various Hycar latex films. In addition, the properties of the latices are outlined showing type, pH, totals solids, particle size, specific gravity, viscosity, dry solids, surface tension and applications. Using test methods from Federal Specification CCC-T-191-B, the report shows the effect of laundering on Hycar-sized denim compared with starch-sized denim. The results of abrasion resistance tests of cotton sheeting and denim, padded in various types of latices, are also given. Color retention after No. 3 ASTM wash test are given for cotton, Orlon, and wool. Treatment of rayon with moderate amounts of urea formaldehyde resins is said to provide good shrinkage control. A 50-50 blend of rayon-acetate suiting of two-ply yarns uniformly blended in both warp and filling was treated with combinations of Hycar 1562 and urea formaldehyde resin. Data showing flex abrasion, Elmendorf tear and crease resistance of the treated suiting are given in tabular form as well as on graphs.

•

Truth Wrested from Nature by Science. Dunlop Rubber Co., Ltd., St. James's House, St. James's St., London S.W. 1 England. 9 x 11 in. 92 pp.

In the history of the future, the mid-twentieth century may well be recognized as the beginning of the Scientific Age. Most great industries in the free world today support groups of scientists and technologists who are constantly thinking in the future, their aim being to bring new and better things to more people every year. Using research as its theme, this illustrated book points out the continuing efforts of the Dunlop Rubber Co. to produce new and better rubber products for industry, agriculture, medicine and the home. Described are such testing methods as the inertia test machine which simulates the conditions of a landing run by an aircraft of nearly 200 tons at a speed of 100 m.p.h.; a resilience gun that calculates the drive of a golf ball; a device that measures tire wear by radiochemistry; a stress-strain machine that gives a diagrammatic indication, optically projected onto a screen, of the strains set up in a tire compound by rapid application and release of load, and a friction meter which gauges the "slip" of vinyl upholstery covering. The book also treats upon fundamental research in natural rubber, latex, synthetic rubber, textiles and plastics.

•

Rubber Products by Lavelle. (Design Hand-Book No. MT-56). Lavelle Rubber Co., 424 N. Wood St., Chicago 22, Ill. 9¾ x 11¼ in. 98 pp.

This catalog contains data on the characteristics and uses of various types of base polymers, as well as their relative resistance to specific chemicals. Another feature is the inclusion of actual rubber and rubberlike swatches presenting various degrees of hardness from Shore Durometer 25 to 95. In addition, eighteen color swatches are presented to show standard colors in which rubber parts can be produced. Valuable suggestions pertaining to the mechanical design of molded and extruded rubber articles are also incorporated along with specific details on mold design and manufacturing processes common to the industry. In addition, the catalog contains sections listing various stock and specialty items, such as bumpers, tips, grommets, bushings, suction cups, extrusions, lathe and die cut articles and miscellaneous molded parts, all made by the company.

The Salesman Story. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 9 x 12 in. 36 pp.

How the modern salesman works, what he does, and why, is portrayed in this booklet. It illustrates the vital function performed by the nation's five million salesmen and the vast sales effort that employs, directly or indirectly, perhaps 15 million men and women. It relates how the old-time drummer passed out of the scene to make way for men who, by their selling create new industries and new products that raise the standard of living for all. By photos and text, the booklet illustrates how many commonplace things have been brought from laboratory to retail counter by creative sales. Among other stories, it tells how sales development of a refrigerant resulted in hundreds of millions of aerosols, the push-button containers dispensing almost everything from insecticides to perfumes. The salesman himself—how he is trained, how he works with customers and his own service staffs, and the progress he develops for better living—is portrayed in a series of case histories.

•

Richardson Class 38 Automatic Bulk Weighing Scales. (Bulletin No. 8946A). Richardson Scale Co., Van Houten Ave., Clifton, N. J. 8½ x 11 in. 6 pp.

This two-color bulletin describes three models of the company's Class 38 automatic weighing unit for bulk materials. These heavy-duty scales are designed for handling dry, ground, granular, dusty and non free-flowing materials, such as ground salt, malt and similar products. The bulletin discusses construction, operation, feeding arrangements and capacities for the scales. Gravity, belt, screw and vibrating feed arrangements are shown in diagram form. Special features, such as hopper door flapper, locking gear, automatic compensation mechanism and automatic tabulator, are described and illustrated. A complete line of accessory equipment, including a pneumatic gate assist, residue beam, remote electric counter, and agitators is discussed. A list of over 120 materials that the scale has handled effectively is included. Twenty-six photographs and diagrams illustrate various installations, scale components and feeding arrangements for these scales.

•

Picco Solvents and Solvent Oils. Pennsylvania Industrial Chemical Corp., Clairton, Penna. 8½ x 11 in. 6 pp.

Technical data on Picco solvents and solvent oils are included in this new bulletin. Results of such tests as boiling range, flash point, color, mixed aniline point and specific gravity are given in tabular form. An explanation of the methods of analysis, which were run according to ASTM designations, are given, as well as a brief description of solvent handling and storage and physiological actions of solvents. The company's line of petroleum naphthas, coal tar aromatic solvents, and solvent oils are designed for use in rubber solvents, reclaiming oils, wire coatings,

Here you'll find the industry's most modern plant coupled with its most modern process. Reclaims made by our patented, continuous-flow **Reclaimator Process** are available in all Standard Grades . . . powdered, extruded slabs, or sheeted slabs.

The addition of the **Reclaimator Process** to our standard pan and digester methods affords the industry the widest selection of reclaims FOR EVERY PURPOSE.

72 years serving the industry,

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U.S. RUBBER RECLAIMING COMPANY, INC
BOX 383 BUFFALO 5, NEW YORK

MARKETS

NEWS-PRICES

NEW YORK, FEBRUARY 6, 1956

Natural Rubber

Since our last report (January 9), the price of spot rubber on the New York Commodity Exchange has moved in a range of 375 points, high for the period being 42.25c reached on January 10 and again on January 11, and low being 38.50c reached on February 3. The average price of spot rubber for the month of January was 41.70c based on 21 trading days. This compares with an average of 48.40 in December, 1955.

One result of the recent meetings in Washington, D. C., between President Eisenhower and Prime Minister Eden of Great Britain may be a relaxation of trade barriers between Communist China and the free world. Before he left London for Washington, Mr. Eden had been specifically asked by Malayan authorities to seek the President's support for a move to ease the Western embargo on shipment of Malayan rubber to Red China.

A spokesman for the U. S. government said that henceforth, the easing of restrictions will be considered in the light of their possible benefit to the economy of free nations. There are a number of trade items, including rubber, the export of which to Red China from Malaya, Ceylon and Indonesia would be an advantage to those countries.

Ceylon Sets Up Supports

Ceylon, meanwhile, has decided to set up an $11,000,000 fund to maintain at certain levels the prices of all grades of rubber produced on the island in the event of a slump in prices. Legislative sanction for such a fund wlil be sought soon.

The fund, to be known as the Rubber Reserve Fund, will be set up from money the government has accumulated during the last four years from the sale of rubber to Communist China. The fund will also be used to meet periodic claims made by Red China in the matter of weight and quality of rubber shipped under the Sino-Ceylonese Trade agreement.

Trade sources in Colombo, Ceylon, believe that the fund will be of great benefit when the producers again have to sell rubber on the open market on completion of the five-year trade agreement with the Chinese next year. Ceylonese producers expect world rubber prices to record a sharp increase within the next few weeks following the start of an all-out offensive against the Communists in Malaya.

Commercial sources in Jakarta, Indonesia, estimate that about 11,000 tons of Indonesian rubber have been diverted to Red China from cargoes consigned to London or Poland on Polish ships. These same sources estimate that 20,000 more would follow soon. Indonesia, which subscribes to the United Nation's embargo on shipment of strategic materials to Red China, has been demanding the lifting of the embargo since the Korean conflict ended.

The sources state that rubber shipments to Red China, which started as a mere trickle about a year ago, have grown since December. This coincided with the inauguration of regular calls in Indonesia's main ports by vessels of the Polish Ocean Lines.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM JANUARY 10 TO FEBRUARY 6

Jan	Spot	March	May	July	Sept.	Sales
10	42.25	41.50	38.80	37.25	36.10	414
11	42.25	41.95	39.30	37.80	36.75	326
12	41.75	41.15	38.50	37.30	36.35	237
13	41.50	41.35	38.55	37.35	36.35	251
14	....	....	....	....	....	...
15	....	....	....	....	....	...
16	40.75	40.40	37.80	36.60	35.45	260
17	40.75	41.30	38.30	37.05	36.00	543
18	40.50	40.95	37.95	36.70	35.50	290
19	40.50	41.00	37.95	36.70	35.40	79
20	40.38	40.40	37.37	36.05	34.95	175
21	....	....	....	....	....	...
22	....	....	....	....	....	...
23	39.75	40.20	36.98	35.80	34.80	282
24	40.00	40.00	36.50	35.30	34.25	252
25	41.00	40.90	37.25	35.95	35.10	261
26	41.00	41.50	37.50	36.40	35.40	206
27	41.75	41.70	37.65	36.40	35.40	260
28	....	....	....	....	....	...
29	....	....	....	....	....	...
30	40.00	39.00	36.25	34.90	33.90	541
31	39.50	39.00	36.55	35.15	34.20	282
Feb.						
1	39.00	38.80	36.55	35.20	34.20	329
2	39.00	39.15	36.75	35.40	34.35	296
3	38.50	39.20	36.55	35.10	34.20	334
4	....	....	....	....	....	...
5	....	....	....	....	....	...
6	39.50	40.25	37.25	35.70	34.80	164

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.39½
February	.39
March	38¾
Thin Latex Crepe:	
Spot	.42
Thin Brown Crepe, No. 2	.34
Flat Bark Crepe	26½

London Market

(Standard Smoked Sheets)

March	36.84 - 36.99
Apr. - June	36.26 - 36.40

Singapore Market

(Standard Smoked Sheets)

March	35.27 - 35.58

Middling Upland Quotations

	Jan. 9	February 6		
	Close	High	Low	Close
March	33.94	35.00	34.91	35.00
May	33.44	34.59	34.45	34.55
July	32.12	33.75	33.48	33.60

Notes and Quotes

According to T. Scott Avary, president of the Wellington Sears Co., a large increase in the use of coated fabrics during 1956 seems to be a certainty. Mr. Avary calls attention to the use of vinyl-coated nylon as a tenting material. This material has the advantage of being much lighter in weight than canvas. The automobile industry is expected to make greater use of vinyl-coated fabrics for upholstery and trim. Still further gains for these materials are foreseen in the commercial furniture field, where coated upholstery fabrics were originally introduced in outdoor furniture. Mr. Avary points to an interesting trend in the mechanical rubber goods field—the developments now taking place in conveyor belts. Many new and stimulating ideas are in progress, such as "moving sidewalks" with a wide range of potential uses. This type of application entails continuing research and study to perfect suitable reinforcing fabrics, he said. Similarly, new fabric developments are under way for many other important applications.

Synthetic Rubber

William I. Burt, president of Goodrich-Gulf Chemicals, Inc., has cautioned Congress that failure to ratify the sale of the Institute, West Va., synthetic rubber plant to his company would extend the present synthetic shortage by as long as a year and one-half. Mr. Burt told the Senate Banking and Currency Committee that this was one of four reasons why the sale of the Institute facility should not be blocked by Congress.

He said that (1) the sale was in the best interests of national security; (2) it would promote a "truly competitive" synthetic rubber industry; and (3) small business was protected by the terms of sale demanded by the government.

The Goodrich-Gulf official denied that acquisition of Institute would give his company 25% of domestic production capacity, even when Institute reaches full production. In about two years, he declared, Goodrich-Gulf will have no more than 18% of output capacity.

Until 1958, the Goodrich-Gulf executive declared, short supplies of butadiene will prevent the operation of more than one of the three production lines at Institute. Therefore, production until that time will be limited to 41,000 long tons a year. Prior to 1958, he stated, "the Goodrich-Gulf share of total usable capacity will be no more than 140,000 tons a year—less than the announced planned capacities of two competitors and about equal to a third".

"We feel strongly," Mr. Burt testified, "that the sale of this plant to Goodrich-Gulf is promotive of a truly competitive synthetic rubber industry, in terms of research, development, production, sales and prices".

Barnes Offers Opinion

In an appearance before the Senate Banking and Currency Committee, Stanley N. Barnes, Assistant Attorney General, stated that the disposal law merely requires the government's anti-trust lawyers "to state the competitive aspects of a proposed sale." The law, he added, "reserves for Congress the ultimate decision".

In an opinion on the anti-trust aspects of the sale at the time it was proposed, Attorney General Brownell said he would be inclined to hold up the transaction if the government weren't involved. But since Congress was to have the final say, he would "express the opinion" that the proposed sale was legal.

Mr. Barnes, in his testimony, noted that the Disposal Commission believed the sale to Goodrich-Gulf was the only one which would return full fair value to the government on the Institute plant. The Justice Department was obligated to make a finding of the competitive effect of the sale, he said, otherwise the report could not have been sent to Congress. He added that the department could not undertake to rule on the validity of the Disposal Commission's conclusion that "the sale of Institute must be either to Goodrich-Gulf or not at all".

The growth of Goodrich-Gulf, assuming the sale goes through, "would not be at the expense of any synthetic rubber producer, existing or potential", he added. This is because the plant now lies idle, and no existing competitor will be eliminated if the government accepts the Goodrich-Gulf bid. But it is true, he added, that acquisition of assets may still violate anti-trust laws.

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [1]
Butaprene NF	.4900 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [2]
Chemigum N3	.5800 [2]
Chemigum N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N7	.5000 [2]
Hycar OR-15	.5800 [3]
Hycar OR-25	.5000 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril C	.5800 [3]
Polysar Krynac 800	.5000 [3]
Polysar Krynac 801	.5800 [3]
Polysar Krynac 802	.5000 [3]
Polysar Krynac 803	.5000 [3]

Butadiene-Styrene Types

Ameripol 1001	.2410 [3]
Ameripol 1002	.2435 [4]
Ameripol 1006	.2410 [3]
Ameripol 1500	.2410 [3]
Ameripol 1501	.2410 [3]
Ameripol 1502	.2410 [3]
Ameripol 1703	.2060 [3]
Ameripol 1705	.2035 [3]
Ameripol 1706	.2035 [3]
Ameripol 1707	.1910 [3]
Ameripol 1709	.1885 [3]
Ameripol 1710	.1885 [3]
Ameripol 1711	.1885 [3]
Ameripol 1712	.1885 [3]
ASRC 1500	.2410 [3]
ASRC 1502	.2410 [3]
Baytown 1600	.1850 [3]
Baytown 1601	.1850 [3]
Baytown 1602	.1850 [3]
Baytown 1801	.1700 [3]
Butaprene S-1000	.2300 [3]
Butaprene S-1001	.2300 [3]
Butaprene S-1004	.2300 [3]
Butaprene S-1006	.2300 [3]
Butaprene S-1009	.2600 [3]
Butaprene S-1010	.2650 [3]
Butaprene S-1012	.2700 [3]
Butaprene S-1013	.2600 [3]
Butaprene S-1015	.2800 [3]
Butaprene S-1500	.2300 [3]
Butaprene S-1502	.2300 [3]
Butaprene S-1703	.1950 [3]
Butaprene S-1705	.1925 [3]
Butaprene S-1710	.1775 [3]
Copo 1500	.2410 [3]
Copo 1502	.2410 [3]
Copo 1712	.1885 [3]
Hycar OS-10	.5500 [3]
Naugapol 1016	.2650 [3]
Naugapol 1018	.2700 [3]
Naugapol 1019	.2650 [3]
Naugapol 1021	.3000 [3]
Naugapol 1022	.2800 [3]
Naugapol 1023	.2850 [3]

Butadiene-Styrene (Cont'd)

Naugapol 1503	.2700 [3]
Naugapol 1504	.2950 [3]
Philprene 1000	.2500 [1]
Philprene 1001	.2500 [1]
Philprene 1006	.2500 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1100	.1990 [1]
Philprene 1104	.1940 [1]
Philprene 1500	.2500 [1]
Philprene 1502	.2500 [1]
Philprene 1503	.2700 [1]
Philprene 1600	.2000 [1]
Philprene 1601	.2000 [1]
Philprene 1602	.2000 [1]
Philprene 1605	.1940 [1]
Philprene 1703	.2120 [1]
Philprene 1706	.2100 [1]
Philprene 1708	.1970 [1]
Philprene 1711	.1940 [1]
Philprene 1712	.1940 [1]
Philprene 1803	.1800 [1]
Plioflex 1000	.2425 [3]
Plioflex 1006	.2425 [3]
Plioflex 1502	.2425 [3]
Plioflex 1703	.2075 [3]
Plioflex 1710	.1900 [3]
Polysar Krylene	.2410 [3]
Polysar Krylene NS	.2410 [3]
Polysar Krynol	.2000 [3]
Polysar Krynol NS	.2050 [3]
Polysar S	.2410 [3]
Polysar S-50	.2410 [3]
Polysar S-65	.2410 [3]
Polysar S-X 371	.2550 [3]
Polysar SS-250	.3000 [3]
S-1000	.2300 [3]
S-1001	.2300 [3]
S-1002	.2325 [3]
S-1006	.2300 [3]
S-1011	.2325 [3]
S-1013	.2300 [3]
S-1100	.1850 [3]
S-1500	.2300 [3]
S-1501	.2300 [3]
S-1502	.2300 [3]
S-1600	.1850 [3]
S-1601	.1850 [3]
S-1602	.1850 [3]
S-1703	.1950 [3]
S-1705	.1925 [3]
S-1706	.1925 [3]
S-1707	.1800 [3]
S-1709	.1775 [3]
S-1712	.1775 [3]
S-1801	.1700 [3]
S-2000	.2275 [3]
S-2101	.2250 [3]
Synpol 1000	.2425 [3]
Synpol 1001	.2425 [3]
Synpol 1002	.2450 [3]
Synpol 1012	.2425 [3]
Synpol 1006	.2425 [3]
Synpol 1007	.2425 [3]
Synpol 1009	.2475 [3]
Synpol 1013	.2500 [3]
Synpol 1500	.2425 [3]

Butadiene-Styrene (Cont'd)

Synpol 1551	.2425 [3]
Synpol 1703	.2075 [3]
Synpol 1707	.1925 [3]
Synpol 1708	.1950 [3]
Synpol 1710	.1900 [3]
Synpol 1711	.1900 [3]

Butyl Rubbers

Enjay Butyl 035	.2300 [3]
Enjay Butyl 150	.2300 [3]
Enjay Butyl 165 NS	.2400 [3]
Enjay Butyl 215	.2300 [3]
Enjay Butyl 217	.2300 [3]
Enjay Butyl 218	.2300 [3]
Enjay Butyl 268 NS	.2400 [3]
Enjay Butyl 325	.2300 [3]
Enjay Butyl 365 NS	.2400 [3]
Polysar Butyl 100	.2450 [3]
Polysar Butyl 101	.2775 [3]
Polysar Butyl 200	.2450 [3]
Polysar Butyl 300	.2450 [3]
Polysar Butyl 301	.2550 [3]
Polysar Butyl 400	.2450 [3]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type GN	.4100 [3]
Neoprene Type GN-A	.4100 [3]
Neoprene Type GN-A-P	.3400 [3]
Neoprene Type GN-P	.3400 [3]
Neoprene Type GN-Special	.3400 [3]
Neoprene Type GN-A-Special	.3400 [3]
Neoprene Type GRT	.4200 [3]
Neoprene Type KNR	.7500 [3]
Neoprene Type S	.4200 [3]
Neoprene Type W	.3900 [3]
Neoprene Type WHV	.3900 [3]
Neoprene Type W-P	.3400 [3]
Neoprene Type W-Special	.3400 [3]
Neoprene Type WRT	.4500 [3]

Silicone Rubbers

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	1.95 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [3]
Thiokol Type FA	.6400 [3]
Thiokol PR-1	.9500 [3]
Thiokol Type ST	1.00 [3]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [2]
Chemigum 235	.5400 [2]
Chemigum 236	.5400 [2]
Chemigum 245	.4600 [2]
Chemigum 246	.4600 [2]
Hycar 1512	.4600 [2]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [2]
Hycar 1562	.4600 [2]
Hycar 1571	.5900 [2]
Hycar 1572	.5100 [2]
Hycar 1577	.4600 [2]

Butadiene-Styrene Types

Butaprene S-2000	.2600 [3]
Butaprene S-2001	.2600 [3]

Butadiene-Styrene (Cont'd)

Butaprene S-2002	.2850 [3]
Butaprene S-2003	.2950 [3]
Butaprene S-2004	.2950 [3]
Butaprene S-2006	.2600 [3]
Copo 2101	.2800 [3]
Copo 2102	.3100 [3]
Copo 2105	.3100 [3]
Copo X-765	.2900 [3]
Pliolite 2101	.3000 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite X-765	.3000 [3]
Naugatex 2000	.2630 [3]
Naugatex 2001	.2630 [3]
Naugatex 2002	.2880 [3]
Naugatex 2005	.3000 [3]
Naugatex 2006	.2630 [3]
Naugatex 2101	.2850 [3]
Naugatex 2105	.3120 [3]
Naugatex X-767	.3230 [3]

Butadiene-Styrene (Cont'd)

S 2000	.2275 [3]
S 2004	.2600 [3]
S 2101	.2250 [3]

Neoprene

Neoprene Latex 60	.4000 [3]
Neoprene Latex 571	.3700 [3]
Neoprene Latex 572	.3900 [3]
Neoprene Latex 601-A	.4000 [3]
Neoprene Latex 735	.3800 [3]
Neoprene Latex 736	.3800 [3]
Neoprene Latex 842-A	.3700 [3]
Neoprene Latex 950	.4700 [3]

Polysulfide Rubbers

Thiokol Type MX	.7000 [3]
Thiokol Type WD-2	.9200 [3]
Thiokol Type WD-6	.7000 [3]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid.

MARKETS

NEWS-PRICES

NEW YORK, FEBRUARY 6, 1956

Reclaimed Rubber

The Rubber Manufacturers Asoociation estimates that 326,678 long tons of reclaimed rubber were produced in the United States in 1955. Some 934 tons were imported and 13,555 exported, leaving a total new supply for the year of 314,057 long tons. RMA also estimated that during 1955, 315,665 long tons were consumed. Stocks at the end of the year are placed at 30,948 long tons.

The most informed estimates place reclaim consumption in 1956 somewhere between 300,000 and 320,000 long tons. It is to be noted that the ratio of use of reclaimed rubber to new rubber has followed a downward trend for the last fifteen years. The high tonnage consumption of the past year reflected the growth of the entire rubber industry rather than a swing to reclaim. Industry capacity now stands at about 420,000 long tons leaving a rather large margin of potential supply.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¾
Fourth Line Whole Tire	.09¾
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Peel	.11
Butyl Tube Reclaim	.16
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

The industry estimates that 290,338 long tons of scrap rubber were consumed in 1955. There were said to be 86,941 long tons of scrap rubber on hand at the year end. Current trade estimates see consumption in 1956 falling slightly behind the previous years' figure.

Little change has been noted in the scrap rubber market during the past period. Early in the period, the tube section of the market exhibited softness, with lower prices noted for mixed auto tubes and Butyl tubes.

The price structure for scrap rubber remains relatively stable and there does not appear to be any likelihood of any drastic rises or falls within the foreseeable future. Current prices, as reported by the trade, for principal grades of scrap follow:

(Prices Delivered Akron)

Mixed tires	ton	18.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	17.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06
Butyl Rubber Tubes	lb.	.06

Tire Fabrics

At this writing, most rayon producers have announced price increases in tire cord yarns of 3 to 5c a pound. It is estimated that costs to be passed on to the tire industry as a result of the price increases will amount to about $20,000,000. Super high tenacity yarns were increased 5c a pound.

Because of the ample supply of rayon goods, it is not anticipated that the hikes will have any firming price effect, but rather will serve as a bolster to the price structure of the relatively shaky man-made fibers market.

The volume of business in the synthetic fabric market has been far from satisfactory in the last several months, and to the eyes of some observers the price increases seem premature. However, the cost-price squeeze is said to have forced producers to up their quotations. Raw material and labor costs have weighed heavily on the producers in the past few months.

May Build Tire Cord Plant

Plans for a major expansion in facilities to produce nylon tire cord are now being studied by DuPont. The project is being considered for Richmond, Va., where DuPont now manufactures both rayon and cellophane. No actual construction has been authorized, but plans and estimates will be made to determine if a plant capable of producing over 35,000,000 pounds annually of heavy denier nylon for use in tire cord and other industrial products should be authorized.

If approved, the plant would raise substantially DuPont's production of heavy denier nylon yarn. This type of heavy nylon, known as 840 denier, is 56 times heavier than the 15 denier which is the popular yarn in women's hosiery.

The company said it would be several months before results of the study are known. It also pointed out that the nylon facility, if constructed, would be in addition to the existing plant for the production of high tenacity rayon yarns in Richmond.

Increasing Use of Dacron

DuPont also reports that Dacron polyester fiber is now being used as the reinforcing material for premium industrial V-belts offered by most manufacturers. These belts were put into commercial production after considerable development work by manufacturers, with the cooperation of DuPont's Textile Fibers Department. Field tests have borne out the results of laboratory tests showing that premium belts reinforced with Dacron are capable of transmitting up to 40% more power than belts made with conventional reinforcing fibers. This superior performance results from Dacron's excellent combination of properties, DuPont states.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.81
1650	lb.	.76½
2200	lb.	.76

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.77
1650	lb.	.72½
2200	lb.	.71½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: London reports that ample near supplies in the East continue to press on the market. This heavy situation may be rectified somewhat by the lower intake of latex during the wintering season, but some curtailment of production would seem to be in order to restore the market to a really healthy condition. In this connection, the recent cutbacks in automobile production both in the United States and abroad may have an adverse effect on natural latex consumption in the near future. During the past few weeks, prices for Hevea latex, in bulk, have ranged from 44 to 45c per pound, East Coast port.

The Rubber Manufacturers Association estimates that 92,032 long tons of Hevea latex were imported into the United States in 1955; 589 long tons were re-exported, leaving a net new supply of 91,443. Consumption of Hevea latex during 1955 is estimated at 83,955 long tons. Stocks at the end of the year stood at 12,679 long tons.

Synthetic: Prices for butadiene-styrene type latices during the past period have ranged between .2275 and .3230 cents per pound. It is understood, of course, that the range covers different types and concentrations. No discernible price movement has been noted for these GR-S type latices, the trade reports.

It is estimated that 71,246 long tons of all types of synthetic latex were consumed in the U. S. in the first eleven months of the year just passed. In the first eleven months of the preceding year 50,296 long tons were consumed, showing 1955 consumption running about 40% ahead of the previous year. It is expected that final figures for 1955 will show that this percentage increase will have held.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of 85 points since our last report (January 9), high for the period being 35.75c reached on February 6, and low being 34.90c reached on January 18. The average price of middling uplands for the month of January was 35.24c based on 21 trading days. This compares with an average of 34.95c in the previous month.

Proposed changes in the official cotton standards for upland cotton staple appear headed for adoption without objection. The Agriculture Department reports that no comments had been received by the January 28 deadline. The Department intends to publish final notice on the standards within the next few weeks. The changes will not, however, take effect until a year later. Under the proposal, the designations "below three-quarter inch" and "three-quarter inch" are to be eliminated. The shortest designation is to become "below 13/16-inch".

According to the International Cotton Advisory Committee, stocks of cotton throughout the world at the start of the present season totaled 20,300,000 bales and may reach 23,000,000 bales by August 1, 1956. The report said it is extremely doubtful if there will be any significant increase in free world cotton consumption.

The Agriculture Department now estimates world cotton production in 1955-56 at 40,300,000 bales, a new record high, and 4% larger than in the 1954-55 season. Cotton loans on 1955 crop cotton totaled 6,649,605 bales.

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CURRENT MARKET PRICES

of rubber chemicals and compounding ingredients

FEBRUARY 6, 1956

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*Trademark. †For Export Only.

The arrangement of this section closely follows the Chemical Section of the 1955-56 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.72	.79
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	—	1.10
Accelerator—49*	lb.	.55	.56
Accelerator 89*	lb.	—	1.20
Accelerator 108*	lb.	—	.90
Accelerator—552*	lb.	—	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	—	.89
Altax*	lb.	.50	.52
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	—	1.07
Ancazide ET*(†)	lb.	—	1.07
ME*(†)	lb.	—	1.14
Arazate*	lb.	—	2.25
Beutene*	lb.	.66	.68
Bismate, Rodform*	lb.	—	3.00
Butazate*	lb.	—	1.04
Butyl Eight*	lb.	1.10	1.35
Captax*	lb.	.40	.42
C-P-B*	lb.	—	1.95
Cumate, Rodform*	lb.	—	1.45
Diorthotolylguanidine	lb.	.60	.61
Diphenylguanidine	lb.	.50	.57
El-Sixty*	lb.	.58	.65
Ethazate*	lb.	—	1.04
50D*	lb.	—	.85
Ethyl Thiurad*	lb.	—	1.04
Ethyl Tuex*	lb.	—	1.04
Ethylac*	lb.	.93	.95
Guantal*	lb.	.58	.65
Harvex*	lb.	.70	.76
Hepteen Base*	lb.	—	1.85
Kure-Blend MT*	lb.	—	.70
Ledate, Rodform*	lb.	—	1.04
MBT-XXX*	lb.	.51	.53
Merac*	lb.	.75	1.05
Mercaptobenzothiazole	lb.	.40	.42
Mercaptobenzothiazyl Disulfide	lb.	.50	.52
Mertax*	lb.	.51	.58
Methazate*	lb.	—	1.04
Monex*	lb.	—	1.14
Mono Thiurad*	lb.	—	1.14
Morfex*	lb.	.65	.67
2-MT	lb.	—	1.00
NA-22* (for neoprene)	lb.	—	1.00
NOBS No. 1*	lb.	.72	.74
Special*	lb.	.77	.79
O-X-A-F	lb.	.51	.53
Pentex*	lb.	—	1.04
Flour*	lb.	—	.21
Permalux (Neoprene)*	lb.	—	2.17
Phenex*	lb.	.52	.57
Polyac*	lb.	—	1.80
R-2 Crystals*	lb.	—	4.35
Rotax*	lb.	.51	.53
RZ-50-A*	lb.	—	1.00
B*	lb.	—	1.00
SA 52*	lb.	—	1.14
SA 57*	lb.	—	1.04
SA 62*	lb.	—	1.04
SA 66*	lb.	—	4.25
SA 67*	lb.	—	1.04
SA 77*	lb.	—	1.04
Santocure*	lb.	.72	.79
NS*	lb.	.78	.85
Selenac* (Ethyl, Methyl)	lb.	—	4.25
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.69	.71
GL*	lb.	1.20	1.30
Tellurac*	lb.	—	1.45
Tepidone*	lb.	.45	.48
Tetrone A*	lb.	—	1.91
Thiofide*	lb.	.50	.57
S*	lb.	.52	.59
Thionex*	lb.	—	1.14
Thiotax*	lb.	.40	.47
Thiurad*	lb.	—	1.14
Thiuram E*	lb.	—	1.04
M*	lb.	—	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Triphenyl Guanidine	lb.	—	.90
Tuads* (Ethyl)	lb.	—	1.04
Tuads* (Methyl)	lb.	—	1.14
Tuex*	lb.	—	1.14
Ultex*	lb.	1.00	1.10
Unads*	lb.	—	1.14
Vulcacure NB*	lb.	—	.45
ZB*	lb.	—	.85
ZE*	lb.	—	.85
ZM*	lb.	—	.85
Z-B-X*	lb.	—	2.45
Zenite*	lb.	.50	.52
A*	lb.	.59	.61
Zenite Special*	lb.	.51	.53
Zetax* (uncoated)	lb.	.51	.53
Zimate* (Butyl)	lb.	—	1.04
Zimate* (Ethyl)	lb.	—	1.04
Zimate* (Methyl)	lb.	—	1.04

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.17¼	.18¼
Cottonseed Fatty Acids			
Wochem 210*	lb.	—	.15¾
211*	lb.	—	.15¾
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S* (dlvd.)	lb.	.12½	.14½
DAR-HY* (dlvd.)	lb.	.14¼	.16¼
Hydrofol Acids* (dlvd.)	lb.	.12½	.18¾
Hyfac 430* (dlvd.)	lb.	.16¾	.18¾
Neo-Fat H.F.O.* (dlvd.)	lb.	.14½	.15¾
Neutrex* (dlvd.)	lb.	.15½	.17½
Stearex Beads* (dlvd.)	lb.	.09¾	.10¾
Stearite*	lb.	.12	.14
Talene* (dlvd.)	lb.	.15¼	.17¼
Lime, Hydrated			
Arrowhead*	ton	—	21.00
Marblehead*	ton	—	17.00
Sierra*	ton	—	22.50
Litharge			
Eagle-Picher*	lb.	—	.18½
SB* (dlvd.)	lb.	—	.18½
Magnesium Oxide, Heavy			
General Magnesite 500*	lb.	.05	.05½
600*	lb.	.05½	.06
Kaiser 325*	lb.	.057	.073
Michigan No. 15*	lb.	.06	.06½
Magnesium Oxide, Light			
Baker's* (neoprene grade)	lb.	.25¼	.26
Carey Mag*	lb.	.25¼	.26
General Magnesite* (neoprene grade)	lb.	.29¼	.30

ACTIVATORS (Cont'd)

Magnesium Oxide, Light (cont'd)			
General Magnesite No. 101*	lb.	.25¼	.28
Genmag ML*	lb.	.25¼	.28
K & M* (neoprene grade)	lb.	.29¼	.30
Light Calcined Magnesia No. X-01*	lb.	.25¼	.26
Light Carbonate of Magnesia, Technical	lb.	.10½	.12
Maglite D*	lb.	.25¼	.26
L and M*	lb.	.29¼	.30
Marine's* (neoprene grade) (l.c.l.)	lb.	.29¼	.30
Michigan No. 30*	lb.	.25¼	.26
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¼	.32
Michigan No. 40*	lb.	.29¼	.30
Oleic Acid			
Emersol 210* (dlvd.)	lb.	.18½	.20½
Groco Red Oil*	lb.	.16½	.20½
Neo-Fat 92-04*	lb.	.18	.19¾
94-04*	lb.	.15½	.17½
Wochem 310, 311	lb.	—	.18½
Palm Fatty Acids			
Groco 45*	lb.	.14¾	.16¾
Wochem 280*	lb.	—	.14¾
281*	lb.	—	.14¾
Potassium Oleate (dms.)	lb.	.30	.73
Red Lead			
Eagle-Picher*	lb.	—	.18½
No. 2 RM* (dlvd.)	lb.	—	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.54	.89
Stearic Acid, Single Pressed			
Emersol 110* (dlvd.)	lb.	.14¾	.16¾
Groco 53*	lb.	.14¾	.16¾
Neo-Fat 18-53*	lb.	.13¾	.14¾
Standard Pearlstearic* (dlvd.)	lb.	.14¼	.16¼
Wochem 730*	lb.	—	.12½
Stearex B* (dlvd.)	lb.	.15½	.16¼
Stearic Acid, Double Pressed			
Choice Pearlstearic* (dlvd.)	lb.	.15¼	.17¼
Emersol 120* (dlvd.)	lb.	.15¼	.17¼
Groco 54*	lb.	.15¼	.17¼
Hydrofol Acid 51RG	lb.	.12½	.14½
Neo-Fat 18-54*	lb.	.14¼	.15¼
Wochem 731*	lb.	—	.14¼
Stearic Acid, Other			
Extra Pearlstearic* (dlvd.)	lb.	.17½	.19½
Groco*	lb.	.12½	.14½
Neo-Fat 18*	lb.	.17½	.18½
18-58*	lb.	.12	.13
18-61*	lb.	.15¼	.16¼
Stearite*	lb.	.12½	.14½
Wochem 720*	lb.	—	.11¾
721*	lb.	—	.11¾
732*	lb.	—	.15¾
White Lead Basic Carbonate	lb.	.19	.20
White Lead Basic Sulfate	lb.	.17¼	.18¼
Zinc Laurate			
Laurex*	lb.	.33	.34
Zinc Stearate	lb.	.39	.44
Zinc Stearate	lb.	.39	.44
Aquazinc K.C.*	lb.	.30	.55

Unclassified Activators

Actifat* (dms.)	lb.	—	.18
Aktone*	lb.	.21¼	.23¼
Barak*	lb.	—	.62
Curade*	lb.	.57	.59
Dibenzo G-M-F	lb.	—	2.60
D-B-A*	lb.	—	1.95
G-M-F*	lb.	—	2.60
Dibutylamine (dlvd.)	lb.	.55	.56
MODX*	lb.	.32½	.34½
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.19	.21
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.* (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	—	.20
Regular*	lb.	—	.12
Anhydrol 6991*	lb.	.51	.56
D.C. Antifoam A*	lb.	5.45	6.65
Antifoam A Emulsion*	lb.	2.05	4.00
Antifoam AF Emulsion*	lb.	2.05	2.85
Defoama W-1701*	lb.	—	.12½
Defoamer A-25*	lb.	—	3.00
Defoamer 630*	lb.	—	.12½
Deltyl Prime	lb.	.70	.80

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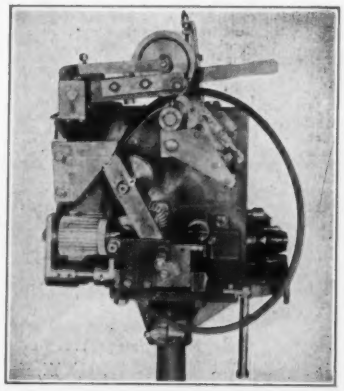

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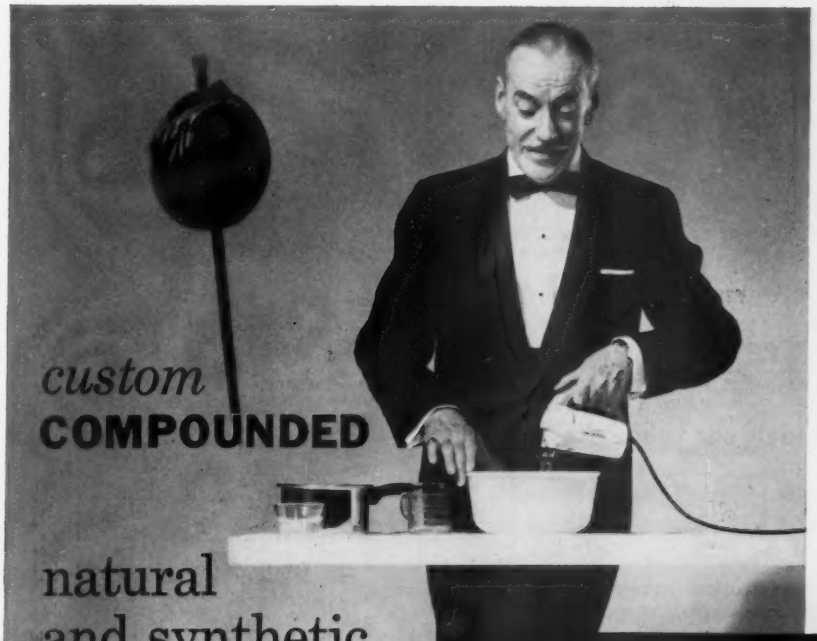

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ANTI-FOAMING AGENTS (Cont'd)

Emcol IM*	lb.	——	.60
G-E Antifoam SS-24*	lb.	5.80 -	6.90
SS-66*	lb.	5.70 -	6.20
Kessco X-3* (dms.)	lb.	——	.35½
X-180*	lb.	——	.29¾
X-181*	lb.	——	.38½
Nopco 1407*	lb.	.19½ -	.20½
1497-V*	lb.	.13¼ -	.14¼
1907-B*	lb.	.18¼ -	.19¼
JMK*	lb.	.48 -	.49
JMU*	lb.	.22½ -	.23½
JMY*	lb.	.19¼ -	.20¼
Pluronic L61*	lb.	.33½ -	.39
RS-968*	lb.	.38 -	.38½
Terpinol Prime No. 1	lb.	.35 -	.50
Tributyl Phosphate (dms.)	lb.	.52 -	.53

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90 -	2.00
AgeRite Alba*	lb.	2.35 -	2.45
Gel*	lb.	.64 -	.66
Hipar*	lb.	.98 -	1.00
H.P.*	lb.	.72 -	.74
Powder*	lb.	.52 -	.54
Resin*	lb.	.75 -	.77
Resin D*	lb.	.52 -	.54
Spar*	lb.	.52 -	.54
Stalite*	lb.	.52 -	.54
Stalite S*	lb.	.52 -	.54
Superlite*	lb.	.52 -	.54
White*	lb.	1.45 -	1.55
Akroflex C*	lb.	.77 -	.79
CD*	lb.	.72 -	.74
Aminox*	lb.	.52 -	.54
Antioxidant 425*	lb.	2.47 -	2.50
Antioxidant 2246*	lb.	1.50 -	1.53
Antox*	lb.	.52 -	.54
Aranox*	lb.	—— -	3.25
Benzoquinone	lb.	1.50 -	1.75
Betanox Special*	lb.	.80 -	.82
B-L-E*	lb.	.52 -	.54
B-X-A*	lb.	.52 -	.54
Deenax*	lb.	.95 -	1.05
Di-tert-Butyl-para-Cresol	lb.	.91 -	.95
Eugenol C-95%*	lb.	2.30 -	2.50
Flectol H*	lb.	.52 -	.59
Flexamine*	lb.	.72 -	.74
Ionol* (dms.)	lb.	.91 -	.95
Neozone A*	lb.	.56 -	.58
C*	lb.	—— -	.80
D*	lb.	.52 -	.54
Nullapon BF-12*	lb.	—— -	.21½
BF-13*	lb.	—— -	.29
BF-78*	lb.	—— -	.62
BF-Acid*	lb.	—— -	.97½
Octamine*	lb.	.52 -	.54
Oxidex*	lb.	—— -	3.60
PDA-10*	lb.	.46 -	.48
Permalux*	lb.	—— -	2.17
Polygard*	lb.	.52 -	.54
Santoflex AW*	lb.	.78 -	.85
DD*	lb.	.52 -	.59
75*	lb.	.92 -	.99
Santovar-A*	lb.	1.50 -	1.57
Santowhite Crystals*	lb.	1.60 -	1.67
Santowhite L*	lb.	.52 -	.59
MK*	lb.	1.29 -	1.36
Powder*	lb.	1.60 -	1.67
Sequestrene AA*	lb.	—— -	.97½
NA2*	lb.	—— -	.79½
NA3*	lb.	—— -	.77½
Stabilite*	lb.	.55 -	.57
Alba*	lb.	.72 -	.77
FLX*	lb.	—— -	.65
L*	lb.	.60 -	.62
White*	lb.	.52 -	.54
White Powder*	lb.	.41 -	.43
Stabilizer No. 1*	lb.	1.55 -	1.80
Stabilizer No. 9-A*	lb.	.80 -	1.05
Styphen I*	lb.	.51 -	.55
Sunolite*	lb.	.16 -	.22
Tannic Acid, Tech.	lb.	.46 -	.48
Thermoflex A*	lb.	.98 -	1.00
V-G-B*	lb.	.70 -	.72
Wing-Stay S*	lb.	.51 -	.53

ANTI-SCORCHING AGENTS

Armeen HT*	lb.	.31 -	.33
Good-rite Vultrol*	lb.	.62 -	.64
Harcopol 1183*	lb.	.70 -	.74
Retarder W*	lb.	—— -	.45
Sodium Acetate 60-62% Crystals	lb.	.08 -	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	.32 -	.38
Arquad S*	lb.	.24 -	.26
Formaldehyde (dms.)	lb.	.06 -	.076
G-4* (bbls.)	lb.	1.09 -	1.29
G-11*	lb.	1.98 -	2.08
Halane*	lb.	.50 -	.60
Nuodex 100 S.S.* (dlvd.)	lb.	—— -	1.10
100 W.D.* (dlvd.)	lb.	—— -	1.25
Zinc 8%* (dms.) (dlvd.)	lb.	.24 -	.28
Ortho Cresol (26°—27°)	lb.	.14 -	.156
Retarder D*	lb.	.42 -	.50
Soligen Drier—Copper 8%* (dms.)	lb.	.20¼ -	.21½
Zinc 8%* (dms.)	lb.	.22¼ -	.23½
Vancide*	lb.	—— -	.80

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	5.13 -	6.50
Webnix 34*	lb.	1.25 -	2.25

AROMATICS (DEODORANTS)

Airkem 115*	gal.	—— -	6.50
122*	gal.	—— -	6.50
186*	gal.	—— -	6.50
Alamask AA*	lb.	—— -	3.00
AF*	lb.	—— -	2.50
AO*	lb.	—— -	1.50
AR*	lb.	—— -	.50
BG*	lb.	—— -	1.15
BGM*	lb.	—— -	.60
CY*	lb.	—— -	2.40
DJ*	lb.	—— -	3.35
DL*	lb.	—— -	1.95
H*	lb.	—— -	5.50
LD*	lb.	—— -	.75
ND*	lb.	—— -	2.75
O*	lb.	—— -	6.50
OS*	lb.	—— -	5.25
Bouquet 149*	lb.	—— -	3.00
Coumarin*	lb.	2.95 -	3.00
Curodex 19*	lb.	4.75 -	4.90
188*	lb.	5.75 -	5.90
198*	lb.	6.75 -	6.90
Deodorant 65*	lb.	—— -	1.85
Deodorant L-37*	lb.	2.00 -	2.40
L-44*	lb.	2.50 -	2.90
N.L.T.X.*	lb.	1.85 -	2.15
Deodorant Oil GD 6422*	lb.	1.90 -	2.20
GD 6423*	lb.	1.60 -	1.90
GD 6575*	lb.	2.40 -	2.90
GD 31063*	lb.	2.25 -	2.75
Ethavan*	lb.	6.75 -	6.80
Latex Perfume 5*	lb.	—— -	3.25
6*	lb.	—— -	7.50
9*	lb.	—— -	1.25
Naugaromes* (dms.)	lb.	.60 -	3.00
Neutroleum Delta*	lb.	—— -	2.60
Gamma*	lb.	—— -	3.60
Parador A*	lb.	1.80 -	2.10
C*	lb.	2.00 -	2.50
E*	lb.	.25 -	.40
GD 5280*	lb.	2.00 -	2.50
GD 53481*	lb.	1.70 -	2.00
Perfume Oil Bouquet Vanilla M*	lb.	2.40 -	2.75
Rodo No. 0*	lb.	4.00 -	4.50
No. 10*	lb.	5.00 -	5.50
Rubbarome* (dms.)	lb.	.60 -	3.80
Rubber Perfume 12*	lb.	—— -	4.35
Russian Leather 7*	lb.	—— -	4.35
Vanillin	lb.	3.00 -	3.25

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	—— -	8.00
Better Blend Soda* (c.l., bags)	cwt.	—— -	2.40
Blowing Agent CP-975*	lb.	.32 -	.35
Celogen*	lb.	—— -	1.95
AZ*	lb.	—— -	1.95
Diazo Amino Benzine	lb.	—— -	.73
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—— -	2.30
Sponge Paste*	lb.	—— -	.20
Unicel ND*	lb.	—— -	.76
S*	lb.	—— -	.20
Urea	lb.	.06 -	.07

BONDING AGENTS

Base 6986*	lb.	.27 -	.32
Braze*	gal.	6.00 -	9.00
Cover Cement*	gal.	2.50 -	4.00
Durez 12987*	lb.	—— -	.54
Gen-Tac Latex*	lb.	.75 -	.85½
Hylene M*	lb.	3.50 -	3.75
M-50*	lb.	1.90 -	2.15
Penacolite B1A*	lb.	—— -	.95
R-2710*	lb.	—— -	.95
Pliobond 20*	gal.	2.91 -	4.23
30*	gal.	3.65 -	4.97
Rex Compounds*	gal.	1.30 -	1.90
Thixons*	gal.	3.30 -	9.00
Ty-Ply Q (BN & S)*	gal.	6.75 -	8.00
Tygobond 30*	gal.	5.50 -	7.45

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00 -	11.00
Glacial 99½% (dms.)	lb.	.12 -	.13
Calcium Nitrate, Tech. Flake	lb.	.12½ -	.15
Hydroxyacetic Acid—70% (dms.)	lb.	—— -	.084
Zinc Nitrate, Tech. Flake	lb.	—— -	.22½

COLORING AGENTS

Black

Aquablak B*	lb.	.09¼ -	.09¾
M*	lb.	.08½ -	.09
R*	lb.	.10¾ -	.11¼
S*	lb.	.11½ -	.12
Black Shield 4-35* (dms.)	lb.	—— -	.09
No. 5	lb.	—— -	.093
No. 6	lb.	—— -	.08
No. 14	lb.	—— -	.11
Carbon Black See *Reinforcing Agents*			
Lampblack No. 10*	lb.	.06 -	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.13¾ -	.13½
Pure Black Iron Oxide	lb.	.14¼ -	.14½

COLORING AGENTS (Cont'd)

Blue

Blue Powders	lb.	2.30 -	5.00
Cooke M.B. Blue*	lb.	2.45 -	2.85
Milori Blue*	lb.	—— -	.52
Monastral Rubber Blue CPL*	lb.	—— -	1.95
PCD, Dispersed*	lb.	—— -	2.20
Peacoline Blue*	lb.	—— -	3.85
Ramapo Blue*	lb.	—— -	3.00
Rubber Blue GD* (Disp.)	lb.	—— -	4.55
Rubber Blue X-1999*	lb.	—— -	1.80
Rubber Dispersed Blues	lb.	2.52 -	2.78
Syntheline Blue*	lb.	—— -	3.85
Stan-Tone MBS*	lb.	1.55 -	4.55
GPE*	lb.	—— -	2.50
PC*	lb.	1.40 -	1.80
Ultramarine	lb.	.14 -	.30
Vansul Blue M.B.*	lb.	.95 -	2.60

Brown

Brown Iron Oxide	lb.	.15¼ -	.15½
Mapico Brown* (50 lb. bags)	lb.	.14¾ -	.14½
Stan-Tone GPE*	lb.	—— -	3.00
Vansul Brown M.B.* (Organic)	lb.	—— -	2.15

Green

Cooke M.B. Green*	lb.	1.45 -	2.80
Filo Green*	lb.	—— -	.34
Green Chromium Oxide, Pure	lb.	—— -	.42½
Green Chromium Oxide, Pure Hydrated	lb.	—— -	1.15
Green Powders	lb.	1.35 -	3.95
Monastral Rubber Green GSD* (Dispersed)	lb.	—— -	2.66
GSL*	lb.	—— -	2.20
Permansa Green CP-594*	lb.	—— -	1.35
Pigment Green B*	lb.	—— -	1.35
GL-652D*	lb.	.90 -	1.00
Ramapo Green*	lb.	—— -	3.50
Rubber Dispersed Greens	lb.	1.23 -	3.08
Rubber Green FD* (Disp.)	lb.	—— -	2.05
Rubber Green X-1292*	lb.	—— -	1.55
Stan-Tone MBS*	lb.	1.55 -	3.35
GPE*	lb.	3.00 -	4.50
PC*	lb.	1.70 -	3.80
Vansul Green M.B.*	lb.	1.05 -	2.90

Maroon

Maroon Powders	lb.	.79 -	3.60
Vansul Maroon M.B.*	lb.	—— -	3.35

Orange

Molybdate Orange	lb.	—— -	.46½
Oswego Orange X2065*	lb.	—— -	3.00
Rubber Orange OD* (Disp.)	lb.	—— -	2.25
Stan-Tone Cadmium Dry*	lb.	2.02 -	4.45
Cadmium Paste*	lb.	2.47 -	3.20
GPE*	lb.	1.20 -	4.35
PC*	lb.	.75 -	2.75
Vansul Orange M.B.*	lb.	2.40 -	2.45

Red

Antimony Trisulfide	lb.	.72 -	.78
R.M.P. Sulfur Free*	lb.	—— -	.78
R.M.P. No. 3*	lb.	—— -	.72
Cadmolith Red* (bbls.)	lb.	1.79 -	2.45
Cooke M.B. Red*	lb.	1.00 -	3.15
Graphic Red (dlvd.)	lb.	—— -	.79
Indian Red, American, Pure*	lb.	.13¾ -	.14
Doxco (English)*	lb.	.11½ -	.11¾
Kroma Reds*	lb.	.14 -	.15
Mapico Reds* (50 lb. bags)	lb.	.12¾ -	.13
Oximony Red Iron Oxide	lb.	.12¾ -	.13
Recco Red Oxide*	lb.	.12 -	.13
Red Iron Oxide, Light	lb.	.13¾ -	.14
Red Powders	lb.	—— -	4.40
Rubber Dispersed Reds	lb.	1.47 -	3.58
Rubber Red PBD* (Disp.)	lb.	—— -	1.75
2BD, Dispersed*	lb.	—— -	1.80
2BL*	lb.	—— -	1.24
PBL*	lb.	—— -	1.65
Rubanox Red CP-762* (dlvd.)	lb.	—— -	1.40
Rubber Red CP-339* (dlvd.)	lb.	—— -	1.10
Rubber Red X-1148*	lb.	—— -	.88
Solfast Red*	lb.	1.50 -	1.95
Stan-Tone MBS*	lb.	1.20 -	3.53
GPE*	lb.	1.65 -	2.00
PC*	lb.	1.30 -	2.50
PDS*	lb.	1.40 -	1.55
PVC*	lb.	1.65 -	1.90
Sun Burnt Red*	lb.	.11½ -	.11¾
Vansul Red M.B.*	lb.	1.00 -	3.35
Watchung Red*	lb.	1.65 -	1.95

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COLORING AGENTS (Cont'd)

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.20¾	.21
20* (50 lb. bags)	lb.	.20¾	.20½

White—Lithopone

Albalith*	lb.	.0800	.0975
Eagle-Picher*	lb.	.0800	.0975
Permolith*	lb.	.0800	.0975
Sunolith*	lb.	.0800	.0975

White—Titanium Pigments

Stan-Tone PC*	lb.	—	.55
Ti-Cal*	lb.	.09	.09¾
R-25*, R-22*, R-27*, R-30*	lb.	.09	.09½
R-60*	lb.	.09¼	.09¾
Ti-Pure*	lb.	.24½	.27½
Anatase Grades*	lb.	.24½	.25½
Rutile Grades*	lb.	.26½	.27½
Titanox A*—all grades (dlvd.)	lb.	.24½	.25½
C-50* (dlvd.)	lb.	.13⅞	.14⅞
RA* (dlvd.)	lb.	.26½	.27½
RA-10* (dlvd.)	lb.	.26½	.27½
RA-NC* (dlvd.)	lb.	.26½	.27½
RC* (dlvd.)	lb.	.09¼	.09¾
RC-HT* (dlvd.)	lb.	.09	.09½
Unitane O-110*	lb.	—	.245
O-220*	lb.	—	.245
O-310*	lb.	—	.245
O-410*	lb.	—	.265
OR-150*	lb.	—	.265
OR-250*	lb.	—	.265
OR-340*	lb.	—	.265
OR-342*	lb.	—	.265
OR-350*	lb.	—	.265
OR-540*	lb.	—	.265
OR-640*	lb.	—	.265
Zopaque*	lb.	.22½	.23½
R*	lb.	.24½	.25½

White—Zinc Oxide (American Process)

AZO-ZZZ 11* (22*, 33*, 44*, 55*)	lb.	.1450	.1550
Eagle-Picher AAA*	lb.	.1450	.1550
Horse Head Special* XX*	lb.	.1450	.1550
Protox 166*	lb.	.1450	.1550
167*	lb.	.1450	.1550
267* (pelleted)	lb.	.1450	.1550
St. Joes Black Label*	lb.	.1450	.1550
Green Label*	lb.	.1450	.1550
Red Label*	lb.	.1450	.1550

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450	.1550
Florence Green Seal*	lb.	.1625	.1725
Red Seal*	lb.	.1575	.1675
White Seal*	lb.	.1675	.1775
Kadox 25*	lb.	.1675	.1775
15*, 17*, 72* & 515*	lb.	.1450	.1550
Protox 168*	lb.	.1450	.1550
169*	lb.	.1450	.1550
268* (pelleted)	lb.	.1450	.1550
U.S.P. (cartons)	lb.	.1775	.1875
XX-78* (l.c.l.)	lb.	—	.15½

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530	.2630

Yellow

Benzidine Yellow	lb.	2.10	2.35
Cadmolith Yellow* (bbls.)	lb.	—	1.15
Chrome Yellow	lb.	—	.33½
Cooke M.B. Yellow 405*	lb.	1.90	2.00
Iron Oxide, Pure			
Light Shades	lb.	.12	.12¼
Dark Shades	lb.	.11½	.11¾
Mapico Yellow* (50 lb. bags)	lb.	.11	.11¾
Rubber Dispersed Yellows	lb.	1.27	2.13
Rubber Yellow GD* (disp.)	lb.	—	2.15
GL*	lb.	—	2.05
Rubber Yellow X-1940*	lb.	—	2.35
Stan-Tone Cadmium Dry*	lb.	2.80	3.03
Cadmium Paste*	lb.	1.63	1.99
MBS*	lb.	1.30	2.20
GPE*	lb.	4.25	4.50
PC*	lb.	.55	3.40
Sumatra Yellow X-1940*	lb.	—	2.35
Toluidine Yellow	lb.	2.00	2.10
YL-660 D*	lb.	1.20	1.25
Oximony Iron Oxide	lb.	.12¾	.13
Vansul Yellow M.B.*	lb.	1.00	2.00
Yellow Powders	lb.	2.00	5.00
Zinc Yellow	lb.	—	.27½

DISPERSING AGENTS

Anchoid*(†)	lb.	.24	.25
Anhydrapent*	lb.	.56	.59
Armeen 18*	lb.	.38	.40
Blancol*	lb.	—	.15¾
Darvan No. 1* (and No. 2*)	lb.	.22	.30
Daxad 11* (21*, 23*)	lb.	.08	.30
Diethanolamine (dms., dlvd.)	lb.	.24½	.27½
Dispersaid*	lb.	1.25	1.35
Emcol K-8300* (dms.)	lb.	.19	.20
Emulphor ON-870*	lb.	—	.55
Furala*	lb.	.06½	.07½
Halloid*	lb.	.04½	.05½
Hycryl A-1000*	lb.	—	.148
Igepal CO-630*	lb.	—	.29
Igepon T-73*	lb.	—	.29½
Kyro EO* (dms.)	lb.	—	.29¾
Leonil SA*	lb.	—	.55
Lomar PW*	lb.	—	.18
Marasperse C*	lb.	.06¼	.06¾
CB*	lb.	.12¼	.13¼
N*	lb.	.09½	.10½
Monoethanolamine (dms., (dlvd.)	lb.	.25	.28
Naccotan A*	lb.	.16½	.21
Nekal BA-75*	lb.	—	.40
BX-78*	lb.	—	.64
Nopco 1187-X*	lb.	.15	.16
Pluronic F68*	lb.	.38½	.44
Polyfon*	lb.	.08	.09
R & R 551*	lb.	—	.28
Rubbex*	lb.	.267	.285
Stablex B*	lb.	.50	.95
Stan-Chem BQC*	lb.	.12¼	.17¼
1067*	lb.	—	.13½
1471*	lb.	.1687	.2187
2251*	lb.	.12¼	.17¼
Trenamine D-25*	lb.	.32½	.36
Triethanolamine (dms., dlvd.)	lb.	.22	.25
U-3051*	lb.	—	.148
Yelkin TT*	lb.	.13	.16
TTS*	lb.	.13	.16

EXTENDERS

Advagum 1098*	lb.	—	.64
Arcco 1071-13B*	lb.	.14½	.15½
1073-18B*	lb.	.13½	.14½
1294-36B*	lb.	.11½	.12½
Car-Bel-Ex-A* (and B*)	lb.	—	.14
Extender 600*	lb.	—	.1765
Facile Gum 4A*	lb.	.48	.50
Millex*	lb.	—	.07
W*	lb.	—	.07
Nopco 2271*	lb.	.15½	.16½
Polyco 418*	lb.	.17	.18
PR-162 Latex Extender*	lb.	—	.182
Solvitose HDF*	lb.	.22	.25
Synprolac*	lb.	.16	.23
Synprowax*	lb.	—	.23
Vistanex*	lb.	—	.45

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite*	lb.	.20	1.33
Lionite*	lb.	.14½	1.25
Pumice	lb.	.03	.05
Walnut Shell Grits	lb.	.05	.08
Aluminum Hydrate	lb.	.0850	.1200
Kaiser Alumina*	lb.	.026	.059
Aluminum Silicate			
Aluminum Flake*	ton	23.50	30.00
Marter White*	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	95.50	-100.00
Barytes			
No. 1 Floated, White*	ton	45.00	65.10
No. 2 Floated, Unbleached*	ton	43.00	63.10
No. 22 Barytes* (c.l.)	ton	—	25.00
No. 3805 Barytes*	ton	22.00	26.75
Foam A*	ton	—	45.00
Sparmite*	ton	80.00	85.00
XIOR*	ton	75.00	80.00
Bentonite (c.l.)	ton	—	13.50
Argosite Clay* (c.l.)	ton	—	12.50
Bennett Clay* (c.l.)	ton	—	32.50
SPV Volclay* (c.l.)	ton	—	12.50
White Hi-Gel*	ton	—	65.90
Blanc Fixe	ton	72.50	-120.00
Calcium Carbonate			
Atomite* (c.l.)	ton	—	32.50
B.I. White No. 1 (c.l.)	ton	—	9.00
Calcene NC*	ton	72.50	92.50
TM*	ton	75.00	95.00
Calwhite*	ton	—	20.00
Camel-Carb*	ton	—	12.00
Camel-Tex*	ton	—	20.00
Camel-Wite*	ton	—	32.50
Duramite*	ton	—	36.00
Gamaco* (c.l.)	ton	—	32.50
Georgia Marble 5-25* (c.l.)	ton	—	20.00
No. 10 White* (c.l.)	ton	—	11.00
Kalite*	ton	50.00	65.00
Keystone White*	ton	—	18.00
Laminar*	ton	—	30.00
Lesamite* (c.l.)	ton	—	27.50
Lorite*	ton	30.00	35.00
Millical*	ton	38.00	53.00
Multifex MM*	ton	110.00	-125.00
Non-Fer-Al*	ton	32.50	37.50
Purecal M*	ton	56.75	80.75
SC*	ton	110.00	-125.00
T*	ton	110.00	-125.00
U*	ton	120.00	-135.00
Rambo No. 1*	ton	—	10.50

FILLERS (Cont'd)

Calcium Carbonate (cont'd)			
Snowflake*	ton	17.00	20.00
Super Multifex*	ton	160.00	-175.00
Surfex*	ton	37.50	52.50
Suspenso*	ton	35.50	50.50
Witcarb Reg.*	ton	56.75	85.00
P*	ton	110.00	-140.00
R*	ton	120.00	-150.00
RC*	ton	110.00	-140.00
York White*	ton	—	9.50
Calcium Silicate			
Silene EF*	ton	120.00	-140.00
Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	—	20.50
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	—	16.00
Chalk Whiting (l.c.l.)	lb.	.01½	.01¾
Recco Paris Whiting*	ton	—	33.00
OMYA Whiting*	ton	—	30.00
Clay			
Afton Clay*	ton	11.00	30.00
Aiken Clay*	ton	—	14.00
Alsilite* (c.l.)	ton	30.00	45.00
Alsite* (c.l.)	ton	—	14.00
Aluminum Flake*	ton	23.50	30.00
Buca* (c.l.)	ton	—	45.00
Burgess No. 20*	ton	—	35.00
No. 30*	ton	—	37.00
Burges Iceberg*	ton	—	50.00
Catalpo* (c.l.)	ton	—	35.00
Champion*	ton	—	14.00
C.S.D.* (c.l.)	ton	—	13.50
Crown*	ton	—	14.00
Dixie* (c.l.)	ton	—	14.00
Franklin Clay—R* (c.l.)	ton	13.50	30.00
G. K. Soft*	ton	11.00	28.00
Harwick Clays*	ton	14.50	57.00
Hi-White R*	ton	—	13.50
Kalloid Clay* (c.l.)	ton	—	10.50
LGB*	ton	—	17.00
LGP*	ton	—	19.00
McNamee* (c.l.)	ton	—	13.50
Natka 1200 (c.l.)	ton	—	12.00
Par* (c.l.)	ton	—	11.00
Paragon*	ton	—	13.50
Pigment 5*	ton	23.50	26.50
33*	ton	—	37.00
Recco* (c.l.)	ton	—	14.00
Swanee Clay*	ton	—	12.50
Snobrite*	ton	—	12.50
Suprex*	ton	—	14.00
Whitetex* (c.l.)	ton	—	50.00
Windsor Clay* (c.l.)	ton	13.00	30.00
Diatomaceous Earth	ton	30.00	50.00
Kaylorite* (c.l.)	ton	—	30.00
Lorite*	ton	—	30.00
Flock			
Cotton (White)	lb.	.28	.32
Colored	lb.	.11	.19
Filfloc F 40-9000*	lb.	—	.13
F 6000*	lb.	—	.36
Polycel*	ton	110.00	-210.00
Rayon, Bleached or Dyed	lb.	.75	1.20
Rayon, Grey	lb.	—	.18
Rayon, Pink	lb.	—	.20
Solka-Floc* (l.c.l.)	lb.	.07	.16
Glue, Amber	lb.	.16	.18
Ground Softwood Bark			
Silvacon* (c.l.)	ton	55.00	-100.00
Leather			
Flour (dust)	lb.	.12	.15
Shredded	lb.	.05	.17
Lignin	lb.	.06	.08
Indulin*	lb.	.06	.08
Limestone, Pulverized	ton	3.00	5.00
Asbestol Regular*	ton	27.00	29.00
Asbestol Superfine*	ton	32.00	34.00
Georgia Marble No. 10*	ton	—	11.00
Industrial Filler No. 100*	ton	—	5.75
Micro Velva A*	ton	49.00	51.00
L*	ton	57.00	59.00
No. 1 White*	ton	—	10.00
Magnesium Carbonate	lb.	.10½	.14¼
K & M Clearcarb*	lb.	—	.14
Technical* (c.l., eqld.)	lb.	.10½	.12
Magnesium Oxide			
Magnesite*	lb.	.057	.073
Magnesium Silicate (see Talc)			
Mica	lb.	.01¼	.07¾
Concord*	lb.	.07½	.08¼
Micro-Mica*	lb.	.07½	.08¼
Mineralite* (c.l.)	ton	40.00	85.00
Silversheen*	lb.	.07½	.08¼
Triple A Mica* (c.l.)	ton	—	25.00
Vermiculite*	lb.	—	.11
Wet Ground Biotite Mica	lb.	.06	.06¾
Wet Ground Mica No. 160*	lb.	.07½	.08¼
Pecan Shell Flour			
Stan Shell*	ton	45.00	75.00
Pyrophyllite			
No. 261*	ton	—	11.50
Pyrax A* (c.l.)	ton	—	13.50
WA* (c.l.)	ton	—	16.00
Sawdust, Graded	ton	14.00	35.00
Silica	ton	16.00	27.00
DC Silica (pelleted)	lb.	1.45	1.65
Extra Fine (bags) (c.l.)	ton	—	43.00
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Lo-Micron Slate Flour*	lb.	—	.04½
No. 133 Slate Flour*	ton	—	4.55
Sodium Silico Aluminate			
Zeolex 23*	ton	120.00	-140.00

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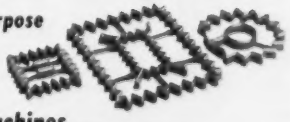

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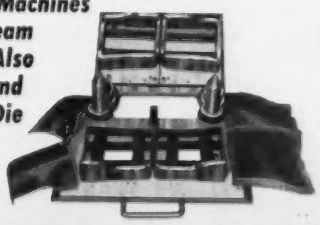

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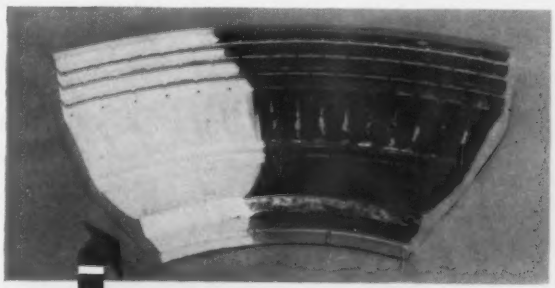

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FILLERS (Cont'd)

Talc (Magnesium Silicate)			
Asbestol Regular*	ton	—	25.00
Eastern RC-500*	ton	—	30.00
No. 41*	ton	—	17.70
No. 549*	ton	—	63.00
French*	ton	—	59.00
L.S. Silver*	ton	32.75	37.75
No. 367*	ton	—	13.00
No. 1600*	ton	—	70.60
No. 1768*	ton	—	13.00
Nytal 200* (c.l.)	ton	—	27.00
300* (c.l.)	ton	—	37.00
Sierra White*	ton	19.75	30.75
Soapstone*	ton	—	13.00
Walnut Shell Flour	ton	55.00	100.00
Stan-Shell*	ton	55.00	100.00
Whiting, Commercial	ton	—	7.50
Allied Whiting*	ton	10.50	21.50
Camel-Carb*	ton	—	10.00
Calwhite (c.l.)	ton	—	20.00
C-C-O White*	ton	—	19.00
Georgia Marble No. 15*	ton	—	20.00
No. 16*	ton	—	20.00
Keystone* (c.l.)	ton	18.00	20.00
Piqua No. 1 YAA* (c.l.)	ton	—	9.00
No. 2 LS* (c.l.)	ton	—	9.00
Snowflake* (c.l.)	ton	—	20.00
Stan-White 325*	ton	10.50	13.10
Veroc* (c.l.)	ton	—	10.50
Welco* (c.l.)	ton	—	10.50
York White R* (c.l.)	ton	—	9.00
Wood Flour	ton	31.50	48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes*	gal.	2.10	2.35
Black Out*	gal.	4.50	8.00
Shellac, Orange Gum	lb.	.50	.60
VanWax*	gal.	1.45	1.50

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	—	.65
Chlorowax 50*	lb.	.16¾	.17¾
70*	lb.	.18½	.20
Halowax*	lb.	.35½	.61½
Zinc Borate 3167*	lb.	.1920	.2020
Zyrox Compounds*	lb.	.38½	.95½

LATEX MODIFIERS

Ludox	lb.	.15	.16¾
OPD-101*	lb.	—	.26
202*	lb.	—	.29
Ubatol U-2001* (dms.)	gal.	1.58	1.67

LUBRICANTS, MOLD

Akro Gel*	lb.	—	.165
Alipal CO-433*	lb.	—	.20
CO-436*	lb.	—	.24
Aquadag*	lb.	3.50	4.00
Aquarex D*	lb.	—	.78
L*	lb.	—	.94
ME*	lb.	—	.80
MDL*	lb.	—	.33
WAQ*	lb.	—	.22
Armid O*	lb.	.39	.41
Borax, Granular (l.c.l.)	ton	89.00	94.00
Carbowax 4000*	lb.	.31	.32
CD Mold Release A*	gal.	—	6.50
B*	gal.	—	5.00
Colite Concentrate* (dms.)	gal.	.90	1.15
Colite D43D*	gal.	1.15	1.40
Concentrex*	lb.	—	.25
Dag Dispersions No. 197*	lb.	1.85	2.90
D.C. 7 Compound*	lb.	5.13	6.50
D.C. Emulsion No. 7*	lb.	1.59	2.07
No. 8*	lb.	1.26	1.80
No. 35*	lb.	1.26	2.50
No. 35A*	lb.	1.26	2.50
No. 35B*	lb.	1.26	2.50
No. 36*	lb.	1.26	2.50
D.C. Mold Release Fluid*	lb.	3.14	4.75
Dri-Lube*	lb.	—	.22
Emulsion Lubricant A80*	lb.	—	1.80
45*	lb.	—	1.80
G-E Silicone Fluid SF-92*	lb.	3.39	5.00
G-E Silicone Emulsion SM-33*	lb.	1.36	1.55
SM-61*	lb.	1.36	1.55
Glydag G*	lb.	1.30	2.45
Hawkeye Flake* (dlvd.)	lb.	.15	.15¾
HSC No. 35*	lb.	1.28	1.34
No. 515	lb.	1.28	1.34
Igepal CO-430*	lb.	—	.29
CO-530*	lb.	—	.29
CO-630*	lb.	—	.29
Igepon AP-78*	lb.	—	.48
T-51*	lb.	—	.13½
Kokobace R*	lb.	.17½	.18½
Lubrex	lb.	.25	.30

LUBRICANTS, MOLD (Cont'd)

Lubri-Flo*	gal.	10.00	12.00
Migralube*	lb.	—	.35
ML-1027-2C*	gal.	—	2.15
ML-1028-2C*	gal.	—	2.15
Mold Lubricant No. 72 Conc.* (dms.)	gal.	—	1.90
No. 735* (dms.)	gal.	—	1.25
No. 769* (dms.)	gal.	—	1.20
No. 825* (dms.)	gal.	—	1.90
No. 856* (dms.)	gal.	—	1.90
No. 880* (dms.)	gal.	—	1.12
No. 887* (dms.)	gal.	—	1.75
No. 896* (dms.)	gal.	—	1.26
No. 935* (dms.)	gal.	—	1.60
No. 956* (dms.)	gal.	—	2.50
No. 965* (dms.)	gal.	—	2.05
No. 967* (dms.)	gal.	—	2.40
No. 969* (dms.)	gal.	—	1.55
No. 975* (dms.)	gal.	—	2.90
No. 980* (dms.)	gal.	—	1.55
No. 987* (dms.)	gal.	—	2.90
Moldeze No. 3*	gal.	5.00	6.00
Mold-Brite*	gal.	—	1.50
Monopole Oil MD*	lb.	—	.16
Olate Flakes*	lb.	.22¾	.23¾
Orvus WA Paste* (dms.)	lb.	—	.22
Plaskon Polyethylene S*	lb.	.32	.47
Polyglycol 15-200*	lb.	.25	.28¾
E4000*	lb.	.31	.37
Prodag*	lb.	.28	.42
Purity Flake* (dlvd.)	lb.	.18	.19¾
Rubber-Flo*	gal.	1.25	2.00
Rubber-Glo*	gal.	—	.94
Rusco Mold Paste*	lb.	—	.25
Sericite* (l.c.l.)	ton	65.00	75.00
SF-92 Silicone Fluid*	lb.	3.70	4.22
Silicone Oil A145*	lb.	3.18	3.61
A65*	lb.	2.50	2.75
SM-33 Silicone Emulsion*	lb.	1.50	1.68
55*	lb.	1.46	2.00
61*	lb.	1.56	1.68
Soybean Lecithin	lb.	.13	.17
Thermalube*	lb.	—	.13¾
UC Silicone L-45*	lb.	3.14	4.75
LE-45*	lb.	1.25	2.50
Ucon Lubricants*	lb.	.26¾	.27¾
Ulco Mold Soap*	lb.	.15	.29

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	—	.25
Emcol DS-50*	lb.	—	.38
RDH-S*	lb.	—	.27
Extrud-o-Lube*	gal.	—	1.54
G.B. Naphthenic Neutrals*	gal.	.11	.18
Ivory Chips*	lb.	.18¾	.19¾
Latex-Lube GR* (dlvd.)	lb.	.19¼	.20
No. 82-A* (450 lb. dms.)	lb.	—	.08½
Propylene Stearate (dms.)	lb.	.35	.60

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.39	.44
Calcium Stearate	lb.	.37	.42
D.C. 4 Compound*	lb.	5.13	6.50
D.C. 200 Fluid*	lb.	3.14	4.75
ELA*	lb.	—	.82
G-E Silicone Fluid SF-92*	lb.	3.39	5.00
Glycerized Lubricant*	gal.	—	1.48
Glydag B*	lb.	1.50	2.10
G*	lb.	1.30	2.45
HSC No. 35*	lb.	1.28	1.34
No. 515*	lb.	1.28	1.34
Hydro-Zinc*	lb.	—	.20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	.18¼
R-66*	lb.	—	.16½
Liqui-Lube* (dlvd.)	lb.	—	.16¾
N.F.* (dlvd.)	lb.	—	.16¾
N.T.* (dlvd.)	lb.	—	.16¾
Lubrex*	lb.	.25	.30
Polyethylene Glycol	lb.	.22	.26
Rubber Free (Concentrate)*	gal.	—	1.44
Jel*	lb.	.18	.21½
Slab-Dip*	lb.	.16	.18½
Soybean Lecithin	lb.	.13	.17
Stock-Lube*	lb.	—	.19
UC Silicone L-45*	lb.	3.14	4.75
Zinc Stearate	lb.	.39	.44

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	1.65
Alkon* (dlvd.)	lb.	.16	.16½
CA-301*	gal.	—	2.29
CA-302*	gal.	—	2.63
G-O 6910*	lb.	.38	.40
Metso Anhydrous*	cwt.	5.35	7.60
Metso 99*	cwt.	4.80	7.05
200*	cwt.	6.30	8.55
Granular*	cwt.	4.10	6.35
Orvus Extra Granules*	lb.	.22½	.23½
Rubber-Sol*	gal.	2.97	3.97
Sprex A.C.* (dlvd.)	lb.	.17¾	.18¾
Zip Mold Cleaner*	gal.	.95	1.45

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	1.25
Pepton 22 Plasticizer*	lb.	.79	.82
RPA 2*	lb.	—	.78
3*	lb.	—	.47
3 Conc.*	lb.	—	.83
5*	lb.	—	.59
6*	lb.	—	1.58

PLASTICIZERS & SOFTENERS

Acto 500*	lb.	—	.09
Adipol BCA*	lb.	.47	.47½
2EH*	lb.	.42½	.45½
10A*	lb.	.42½	.45½
ODY*	lb.	.47	.50
810*	lb.	.42½	.45½
XX*	lb.	.42½	.45½
Anhydrol 6990*	lb.	.51	.56
Arneel*	lb.	.27	.39
Arolene 1980* (c.l.)	lb.	—	.10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.05	.06½
Aromatic Tar	gal.	.0573	.1973
Bardol*	lb.	.02¾	.03¾
B*	lb.	.06¾	.06½
Bayol D*	gal.	—	.382
F*	gal.	—	.52
Beeswax, Bleached	lb.	.80	.83
Yellow Refined	lb.	.75	.80
Bondogen*	lb.	.55	.60
B.R.C. No. 20*	lb.	.0150	.0175
No. 21*	lb.	.02¾	.03
No. 22*	lb.	.02½	.02¾
B.R.H. 2*	lb.	.0213	.0351
BRS 700*	lb.	.0200	.0285
B.t.T. 3*	lb.	.0180	.0265
4*	lb.	.0250	.0260
7*	lb.	.0300	.0310
B.R.V.*	lb.	.0475	.0565
Bunarex Resins*	lb.	.07	.08
Bunatak AH*	lb.	—	.09½
N*	lb.	—	.31
U*	lb.	—	.17½
No. 90*	lb.	—	.09
No. 210*	lb.	—	.14
Butac*	lb.	.12½	.13½
BxDC (dms.)	lb.	.40	.41
Butyl Carbitol Perlargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Perlargonate (dms.)	lb.	—	.68
Butyl Oleate	lb.	.23¼	.26
Butyl Palmitate	lb.	—	.26½
Butyl Stearate (dms.)	lb.	.22¾	.24¼
BWH-1*	lb.	.16	.17
Cabflex DDA*	lb.	.42½	.45½
DDP*	lb.	.30½	.33½
Di-BA*	lb.	.43¾	.46¼
Di-OA*	lb.	.42½	.45½
Di-OP*	lb.	.30½	.33½
Di-OZ*	lb.	.48	.51
DOA*	lb.	.42½	.45½
DOP*	lb.	.30½	.33½
HS-10	lb.	.44	.47
ODA*	lb.	.42½	.45½
ODP*	lb.	.30½	.33½
TCP*	lb.	.34½	.37½
Califlux 510* (and 550*)	lb.	.02½	.03¼
G.P.*	lb.	.01¾	.02
R-100*	lb.	.04½	.05¼
TT*	lb.	.0170	.0245
Candelilla Wax, Prime	lb.	.52	.54
Refined Light	lb.	.55	.58
Carbowax 4000* (dms.)	lb.	.31	.32
Carnauba Wax, Crude	lb.	.60	.62
Flaked	lb.	.75	1.20
Refined, Technical	lb.	.65	.68
Refined, Pure	lb.	.75	.80
Yellow	lb.	1.10	1.15
Celluflex* (dms.) 112* (t.c., dlvd.)	lb.	—	.34½
179-A* (t.c., dlvd.)	lb.	—	.34½
179-C* (t.c., dlvd.)	lb.	—	.34½
179-EG* (t.c., dlvd.)	lb.	—	.34½
DBP* (t.c., dlvd.)	lb.	—	.30
DOP* (t.c., dlvd.)	lb.	—	.30½
TPP* (dms., eqld.)	lb.	—	.40
Ceresin Wax	lb.	.11½	.28
Chlorowax 40*	lb.	.15¼	.17¼
50*	lb.	.16¾	.17¾
70*	lb.	.18½	.20
LV*	lb.	.17¼	.19¼
Chlorowax 40*	lb.	.14½	.15½
CTLA Polymer*	gal.	.20	.36
Cumar Resins*	lb.	.07	.19
Darex DBP*	lb.	.33	.35¾
DOP*	lb.	.34	.37
DIOP*	lb.	.34	.37
D.B.M.*	lb.	.32	.34¾
Decylbutyl Phthalate	lb.	.27	.30
Degras, Common	lb.	—	.14
Diallyl Phthalate	lb.	.49¾	.52¼
Dibenzyl Sebacate	lb.	.88	.89½
Dibutoxyethyl Sebacate	lb.	—	.56¾
Dibutyl Phthalate	lb.	.30	.33
Dibutyl Sebacate	lb.	.64½	.67
Dicapryl Adipate	lb.	.42	.44
Dicapryl Phthalate	lb.	.29½	.31½
Dicapryl Sebacate	lb.	.58	.59½
Di-Carbitol Phthalate (dms.)	lb.	.42	.42½
Dicyclohexyl Phthalate	lb.	.58¼	.59¼
Diethyl Phthalate (t.c.)	lb.	.25	.27¾
Di-2-ethylhexyl Phthalate	lb.	—	.30½
Dihexyl Adipate	lb.	.42	.44
Dihexyl Phthalate	lb.	.30	.32

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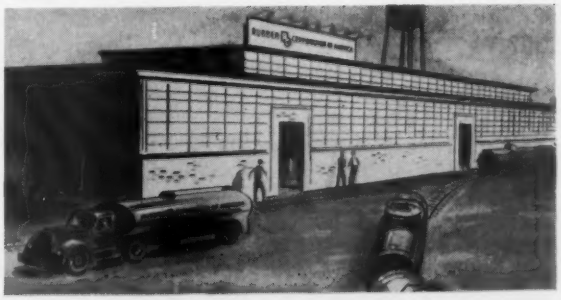

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PLASTICIZERS & SOFTENERS (Cont'd)

Dihexyl Sebacate	lb.	.62	.63½
Diisobutyl Azelate	lb.	—	.47¾
Di-iso-octyl Adipate	lb.	.42½	.45½
Di-iso-octyl Phthalate (t.c.)	lb.	.30½	.33½
Dimethyl Phthalate (t.c.)	lb.	.27½	.30¼
Dimethyl Sebacate	lb.	1.25	1.26¼
Dinonyl Adipate	lb.	.44½	.47½
Dinopol 235*	lb.	.35½	.38½
IDO*	lb.	.30½	.33½
MOP*	lb.	.32½	.35½
Dioctyl Adipate	lb.	.42½	.45½
Dioctyl Phthalate (dms.)	lb.	.30½	.33½
Dioctyl Sebacate (dms.)	lb.	.58½	.61
D.I.O.P. (dms.)	lb.	.30½	.33½
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex 6*	gal.	—	.11
15E*	gal.	—	.10
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.58
Epoxy Plasticizer	lb.	.33½	.36
Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.27	.28
DOP*	lb.	.32½	.33½
TOF*	lb.	.45½	.46½
3GH*	lb.	.45½	.46
3GO*	lb.	.54½	.55
4GO*	lb.	.34½	.35½
426*	lb.	.29	.30
Flexricin P-1*	lb.	—	.32
P-4*	lb.	—	.31
P-6*	lb.	—	.37
P-8*	lb.	—	.33
Fortex* (dms.)	lb.	.12½	.14½
Galex W-100*	lb.	.15½	.19¼
G.B. Asphaltic Flux*	gal.	.10	.18
G.B. Light Process Oil*	lb.	.02½	.03¼
Medium Process Oil*	lb.	.03½	.04¼
G.B. Naphthenic Neutrals*	gal.	.11	.18
Good-rite GP233*	lb.	.44¼	.47¾
GP235*	lb.	.42½	.45½
GP236*	lb.	.42½	.45½
GP261*	lb.	.34	.37
GP265*	lb.	.30½	.33½
GP266*	lb.	.30½	.33½
Harflex 500* (dms.)	lb.	.31½	.33½
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron-Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07¼	.07¾
HSC No. 13*	lb.	.20	.27
No. 28 and 38*	lb.	.20	.27
Indonex 632½* (633½*, 634½*, 637½*)	gal.	.11	.17
Isooctyl Decyl Phthalate	lb.	.30½	.33½
Kapsol*	lb.	.32¼	.35¼
Kenflex*	lb.	.18	.27
Kesscoflex 101* (dms.)	lb.	—	.39
102* (dms.)	lb.	—	.32½
103* (dms.)	lb.	—	.41½
104* (dms.)	lb.	—	.48
105* (dms.)	lb.	—	.33¼
106* (dms.)	lb.	—	.35½
108* (dms.)	lb.	—	.37
109* (dms.)	lb.	—	.36¼
KP 23*	lb.	.29	.32
90*	lb.	.40	.43
140*	lb.	.46	.48½
201*	lb.	.58¼	.59¼
220*	lb.	.31	.34
555*	lb.	.45	.47½
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kronisol* (dms.)	lb.	.33	.36
Kronitex AA* (dms.)	lb.	.34½	.37½
I* (dms.)	lb.	.34½	.37½
K-3*	lb.	.34½	.37½
MX*	lb.	.34½	.37½
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.30½
Lindol* (dms., t.c.)	lb.	.34½	.37½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.38½	.41
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.21	.27
Flaked	lb.	.27	.29
Morflex*	lb.	.32	.69½
MR 2088* (dms.)	lb.	—	.19
Natac*	lb.	.12	.13
Nebony Resins* (dms.)	lb.	.04½	.07¼
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12½	.17½
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24
Nuba 1* (and 2*) (dms.)	lb.	.06½	.06¾
3X* (dms.)	lb.	.07¾	.08¼
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.29½	.32½
R9* (dms.)	lb.	.35½	.37¾
Ortho-Nitrobiphenyl	lb.	.13	.15

PLASTICIZERS & SOFTENERS (Cont'd)

Ozokerite Wax, White and Yellow	lb.	.24	.31
Paradene Resins (dms.)	lb.	.07¼	.08
Para Flux* (dms.)	gal.	.19¼	.20¼
2016* (dms.)	gal.	.22	.23
Para Lube* (t.c.l.)	lb.	.046	.048
Paraplex G-60*	lb.	.35	.36
G-62*	lb.	.37½	.38½
Parmo*	lb.	.06	.13½
Pepton 22 Plasticizer*	lb.	.79	.82
PG-16*	lb.	—	.35
Philrich-5* (t.c.)	gal.	—	.11
Picco 10* (and 25*)	lb.	.15	.17
60* (and 75*)	lb.	.15	.17
100*	lb.	.15	.17
Piccocizer 30*	lb.	.05½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.28	.29
FT* (FHF* & FX*)	lb.	.1815	.1965
T-135*	lb.	.22¼	.23¼
Piccolyte S Resins*	lb.	.20½	.22¾
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.24½
Pigmentar*	lb.	.0460	.0745
Pigmentaroil*	lb.	.0460	.0745
Plastac M*	lb.	—	.09¼
Plasticizer 2286*	lb.	—	.26¼
Plasticizer 4141*	lb.	.56¾	.66¾
Plasticizer DP-200, DP-250, DP-520*	lb.	.42¼	.46¼
Plasticizer MT-511*	lb.	—	.68¾
Plasticizer ODN*	lb.	.34	.40
Plasticizer SC*	lb.	.50	.51
Plasticizer W-13*	lb.	.37	.38¾
Plastoflex 3*	lb.	—	.52
50*	lb.	.34¼	.35¼
55*	lb.	.31	.32
520*	lb.	.37½	.38½
SP-2*	lb.	—	.43
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.07¾	.08
Plastolein 9050* (c.l.)	lb.	.54	.56
9055*	lb.	.30	.32
9058*	lb.	.50	.52
9250*	lb.	.37¾	.39¼
9715*	lb.	.42½	.45½
Plastone*	lb.	.23	.27
Polycizer 162*	lb.	.30½	.33½
332*	lb.	.39	.41
562 and 662*	lb.	.30½	.33½
532 and 632*	lb.	.42½	.45½
ED*	lb.	—	.51
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.19½	.20½
D*	lb.	.23½	.24½
6*	lb.	.05¾	.07¾
Process Oil C-255* (c.l.)	gal.	—	.22
Propylene Stearate (dms.)	lb.	—	.32
PRR 1*	gal.	.15	.35
PT 67 Light Pine Oil* (dms.)	gal.	—	.60
101 Pine Tar Oil* (t.c., dms.)	gal.	.0460	.0634
400 Pine Tar* (600* & 800*) (t.c., dms.)	gal.	.0460	.0634
PX-104*	lb.	.32	.33
PX-108*	lb.	.32½	.33½
PX-138*	lb.	.32½	.33½
PX-208*	lb.	.44½	.45½
PX-238*	lb.	.44½	.45½
PX-404*	lb.	.66	.67
PX-438*	lb.	.60	.61
PX-800*	lb.	.34	.35
PX-917*	lb.	.36½	.37½
Reogen*	lb.	.13¼	.13½
465 Resin* (dms.)	lb.	.07½	.08
Resin 731-C*	cwt.	—	15.00
Resin C*	lb.	.0225	.0310
Resinex*	lb.	.03¼	.04¾
L-4*	lb.	.02¼	.03¼
Rexflex*	lb.	—	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	—	.36
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	—	.25¼
Santicizer B-16*	lb.	.48¾	.49¾
E-15*	lb.	.52¾	.53¾
M-17*	lb.	.44¾	.45¾
No. 140*	lb.	.36½	.37½
No. 141*	lb.	.36	.37
No. 160*	lb.	.28½	.29½
No. 602*	lb.	—	.30½
No. 603*	lb.	—	.27
Sherolatum*	lb.	.03½	.06
Solarite Resin No. 11*	lb.	.16½	.22½
Staflex DBES*	lb.	.58	.60½
DOS*	lb.	.58	.60½
TXA*	lb.	.32	.35
KA*	lb.	.36	.38¾
Stan Chlor Oils*	lb.	.13½	.20½
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.053	.089
Wax*	lb.	.31	.33
Sunny South Burgundy Pitch*	lb.	.1030	.1085
Pine Tar*	lb.	.0460	.0801
Pine Tar Oil*	lb.	.0460	.0745
Rosin Oil*	gal.	.58	.87½
Superla Wax*	lb.	.34½	.44
Syncera Wax*	lb.	.23	.34
Syn Tac* (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16
Tar, Refined	gal.	.1200	.1760
Terpene A*	gal.	—	.65
TP-90B*	lb.	.59	.69
TP-95*	lb.	.65	.75

PLASTICIZERS & SOFTENERS (Cont'd)

Transphalt Resins*	lb.	.02¼	.04¼
Tributyl Phosphate	lb.	.50	.53
Tricresyl Phosphate	lb.	.34½	.37½
Turgum S*	lb.	.10¾	.11¾
Vanadiset B*	lb.	.036	.07
C*	lb.	.031	.06
MR 80 Mesh*	lb.	.08½	.12½
Vistac No. 1*	gal.	1.00	1.21
P*	lb.	.18	.18½
Vopcolene 50*	lb.	—	.37
Witcizer 100*	lb.	.26	.27
200*	lb.	.26	.27
201*	lb.	.22¾	.23½
300*	lb.	.30	.33
312*	lb.	.30½	.33½
313*	lb.	.30½	.33½
412*	lb.	.42½	.45½
Witresin*	ton	50.00	57.50

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	—	.21
Refined (dms.)	lb.	—	.18½
Castorwax*	lb.	—	.24½
Dutrex 7*	lb.	.12	.20
ELA*	lb.	—	.82
Emcol MAS*	lb.	—	.44
Hydrofol Glycerides 200*	lb.	.15½	.19¾
Kenflex N*	lb.	—	.18
Maleic Anhydride	lb.	—	.27
Millrex*	lb.	—	.15
Nadic Anhydride	lb.	—	.27
Polycin 783*	lb.	—	.24½
Resin No. 510*	lb.	.15	.22
Pulverized*	lb.	.20½	.25
Thiomalic Acid	lb.	—	2.50
Zyrox*	lb.	.50	.79

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¼	.21
Alpha Protein	lb.	—	.23
Aroostocrat*	lb.	—	.07½
Carob Bean Flour	lb.	—	.30
Casein	lb.	.32	.38
Emcol K-8300* (dms.)	lb.	.19	.20
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	—	.19
Karaya Gum	lb.	—	.25
Locust Bean Gum	lb.	—	.31
Prosein*	lb.	—	.06
Stablex B*	lb.	.50	.95
K*	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.32	.33
Armeen C*	lb.	.45	.47
Mixed Crude*	lb.	.17	.23
T*	lb.	.29	.31
Burco RA*	lb.	.05½	.08¼
C-6 Oil* (28* & 32*)	gal.	.33	.38
C-10 Oil*	gal.	.25	.30
C-33* (t.c.)	gal.	—	.21½
C-42* (t.c.)	gal.	—	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—	4.50
Liquid 50% (t.c.)	cwt.	—	2.80
Solid 76% (c.l., dms.)	cwt.	—	4.10
Cresylic Acid (99-100%)	gal.	.80	.94
D-4* (t.c.)	gal.	—	.27
E-5* (t.c.)	gal.	—	.25
Flake Calcium Chloride (77-80%)	ton	—	29.00
G.B. Reclaiming Oil*	gal.	.12	.18
CD-10*	gal.	.10	.16
CD-50-U*	gal.	.18	.24
Gensol No. 6* (t.c.)	gal.	—	.40
Heavy Aromatic Naphtha	gal.	—	.13¼
LX-77 Reclaiming Solvent*	gal.	.21	.33
LX-572 Reclaiming Oil*	gal.	.27	.32
LX-777 Reclaiming Oil*	gal.	.23	.33
Neo-Fat D-242*	lb.	.05½	.07¾
No. 517 H.B. Oil*	gal.	.11½	.16½
535*	gal.	.22	.27
PT 67 Light Pine Oil* (dms.)	gal.	—	.60
PT 101 Pine Tar Oil* (t.c., dms.)	gal.	.0460	.0634
PT 150 Pine Solvents* (dms.)	gal.	—	.44
Q Oil* (t.c.)	gal.	—	.286
Reclaiming Oil 3186-G*	gal.	.25	.36½
Reclaiming Reagent No. 1431*	lb.	.21	.25
R.P.A. No. 3*	lb.	—	.47
RR-10*	lb.	—	.36
Soda Ash (c.l., bags)	cwt.	—	1.75
Solvent 534*	gal.	.20½	.26½
Solvent Oil 21*	gal.	.24	.29
C-42*	gal.	.23	.38
Union Solvent 4060-O*	gal.	—	.184
X-1 Resinous Oil*	lb.	.0210	.0300

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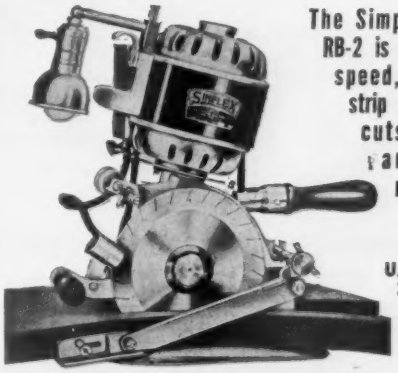

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U. S. Patent 2,294,497

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Forced draft ovens	Weatherometer
Compression-deflection	Oxygen bomb
Plasticity	Abrasion
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	Adhesive Strength

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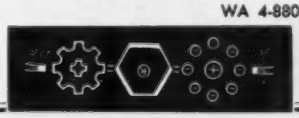

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REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98*	lb.	.0740 -	.1225
Continental F*	lb.	.0740 -	.1225
Croflex*	lb.	.0740 -	.1225
Dixiedensed (and S)*	lb.	.0740 -	.1225
HX HPC*	lb.	.0740 -	.1225
Kosmobile (and S)*	lb.	.0740 -	.1225
Micronex HPC*	lb.	.0740 -	.1225
Spheron 4*	lb.	.0740 -	.1225
Witco No. 6*	lb.	.0740 -	.1225

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0740 -	.1225
Atlantic MPC-95*	lb.	.0740 -	.1225
Collocarb*	lb.	—— -	.0625
Continental A*	lb.	.0740 -	.1225
Croflex TH*	lb.	.0740 -	.1225
Dixiedensed HM (and S-66)	lb.	.0740 -	.1225
Kosmobile HM (and S-66)	lb.	.0740 -	.1225
Micronex Standard*	lb.	.0740 -	.1225
Spheron 6*	lb.	.0740 -	.1225
Texas M*	lb.	.0740 -	.1225
Witco No. 1*	lb.	.0740 -	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42*	lb.	.0740 -	.1225
Collocarb*	lb.	—— -	.0625
Continental AA*	lb.	.0740 -	.1225
Croflex 77*	lb.	.0740 -	.1225
Dixiedensed 77*	lb.	.0740 -	.1225
Kosmobile 77*	lb.	.0740 -	.1225
Micronex W-6*	lb.	.0740 -	.1225
Spheron 9*	lb.	.0740 -	.1225
Texas E*	lb.	.0740 -	.1225
Witco No. 12*	lb.	.0740 -	.1225
Wyex EPC*	lb.	.0740 -	.1225

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2400 -	.3200
Dixie 5 Dustless*	lb.	.1200 -	.1900
Dixie Voltex*	lb.	.2400 -	.3200
Kosmink Dustless*	lb.	.1200 -	.1900
Kosmos Voltex*	lb.	.2400 -	.3200
Spheron C*	lb.	.1500 -	.1950
Voltex*	lb.	.2400 -	.3200

Channel, Surface Treated (STC) (bags)

Texas 109*	lb.	.0790 -	.1275

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0890 -	.1290
Shawinigan Acetylene Black*	lb.	.1700 -	.2600
Vulcan C*	lb.	.1050 -	.1500

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0600 -	.1000
Collocarb*	lb.	—— -	.0525
Continex FEF*	lb.	.0600 -	.1000
Croflex 50*	lb.	.0600 -	.1000
Dixie 50*	lb.	.0600 -	.1000
Kosmos 50*	lb.	.0600 -	.1000
Philblack A*	lb.	.0600 -	.1000
Statex M*	lb.	.0600 -	.1000
Sterling SO*	lb.	.0600 -	.1000

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0650 -	.1050
Sterling 99*	lb.	.0650 -	.1050

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0500 -	.0900
Dixie 35*	lb.	.0500 -	.0900
Kosmos 35*	lb.	.0500 -	.0900
Sterling V*	lb.	.0500 -	.0900
V (Non-Staining)	lb.	.0500 -	.0900

Furnace, High Abrasion (HAF) (bags)

Aromex HAF*	lb.	.0740 -	.1140
Continex HAF*	lb.	.0740 -	.1200
Croflex 60*	lb.	.0740 -	.1140
Dixie 60*	lb.	.0740 -	.1140
Kosmos 60*	lb.	.0740 -	.1140
Philblack O*	lb.	.0740 -	.1140
Statex R*	lb.	.0740 -	.1200
Vulcan 3*	lb.	.0740 -	.1140

Furnace, High Modulus (HMF) (bags)

Collocarb*	lb.	—— -	.0525
Continex HMF*	lb.	.0550 -	.0950
Croflex 40*	lb.	.0550 -	.0950
Dixie 40*	lb.	.0550 -	.0950
Kosmos 40*	lb.	.0550 -	.0950
HMF*	lb.	.0550 -	.0950
Modulex HMF*	lb.	.0550 -	.0950
Statex 93*	lb.	.0550 -	.0950
930*	lb.	.0470 -	.0870
Sterling L*	lb.	.0550 -	.0950
LL*	lb.	.0550 -	.0950

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, Semi-Reinforcing (SRF) (bags)

Collocarb*	lb.	—— -	.0400
Continex SRF*	lb.	.0450 -	.0850
Croflex 20*	lb.	.0475 -	.0875
Dixie 20*	lb.	.0475 -	.0875
Essex SRF*	lb.	.0475 -	.0875
Furnex*	lb.	.0475 -	.0875
Gastex*	lb.	.0525 -	.0925
Kosmos 20*	lb.	.0475 -	.0875
Pelletex*	lb.	.0475 -	.0875
NS*	lb.	.0475 -	.0875
Shawinigan Acetylene Black*	lb.	.1700 -	.2600
Sterling NS*	lb.	.0475 -	.0875
R*	lb.	.0525 -	.0925
S*	lb.	.0475 -	.0875

Furnace Super Abrasion (SAF) (bags)

Philblack E*	lb.	.1250 -	.1650
Vulcan 9*	lb.	.1250 -	.1650

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0900 -	.1300
Continex ISAF*	lb.	.0900 -	.1350
Dixie 70*	lb.	.0900 -	.1350
Kosmos 70*	lb.	.0900 -	.1350
Philblack I*	lb.	.0900 -	.1300
Statex 125*	lb.	.0900 -	.1350
Vulcan 6*	lb.	.0900 -	.1300

Furnace, Super Conductive (SCF) (bags)

Vulcan SC*	lb.	.1800 -	.2230

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	—— -	.0550
Sterling FT (c.l.)*	lb.	—— -	.0550

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	—— -	.0250
Sterling MT (c.l.)*	lb.	—— -	.0400
MT Non-Staining (c.l.)*	lb.	—— -	.0500
Thermax (c.l.)*	lb.	—— -	.0400
Stainless (c.l.)	lb.	—— -	.0500

REINFORCING AGENTS—SILICA

Cab-O-Sil (compressed)*	lb.	.68 -	.75
Cab-O-Sil (uncompressed)*	lb.	.68 -	.75
D. C. Silica (pelletized)*	lb.	1.45 -	1.65
Hi-Sil 101*	lb.	.10 -	.11½
233*	lb.	.09 -	.10½
X303*	lb.	.40 -	.45
Santocel*	lb.	.62 -	.64

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	—— -	.60
Darex Copolymer No. 3*	lb.	.47 -	.49
X34*	lb.	.42 -	.44
43G*	lb.	.39 -	.41
Darex Copolymer Latex No. 3-L (and X34L)*	lb.	.36½ -	.39
Durez 12687 (and 12707)*	lb.	—— -	.37
Durez 13355*	lb.	—— -	.28
Good-rite Resin 50*	lb.	.39 -	.41
Hystron*	lb.	.39 -	.41
Kralac A-EP*	lb.	.39 -	.41
Lampblack	lb.	—— -	.12
Marbon S and S-1*	lb.	.39 -	.41
8000*	lb.	.39 -	.41
Marmix*	lb.	.39 -	.41
Pliolite Latex 150*	lb.	.35 -	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33 -	.57
Pliolite NR*	lb.	.93 -	.95
S6B*	lb.	.39 -	.41
Plio-Tuf G85C*	lb.	.52 -	.54
Polyco 220*	lb.	.18¼ -	.19¼
Polypol S-70*	lb.	.22 -	.23

RETARDERS

Benzoic Acid TBAO-2*	lb.	—— -	.44
Dutch Boy Normasal*	lb.	—— -	.46
ESEN*	lb.	.35 -	.37
Good-rite Vultrol*	lb.	.62 -	.64
Harcopol 1183*	lb.	.70 -	.74
Retarder J*	lb.	.62 -	.64
PD*	lb.	.35 -	.37
W*	lb.	—— -	.45
Retardex*	lb.	.47 -	.50

RUBBER SUBSTITUTES

Mineral Rubber

Black Diamond*	ton	50.00 -	60.00
Byerlyte*	ton	50.00 -	57.00
Hard Hydrocarbon (dms.)*	ton	46.50 -	48.50
Herron Flake*	ton	—— -	45.00
Mineral Rubber, Solid	ton	42.50 -	44.50
M. R. No. 38*	ton	50.00 -	60.00

Vulcanized Vegetable Oils

Amberex*	lb.	.29 -	.36
Brown*	lb.	.1310 -	.2200
Car-Bel-Lite*	lb.	.3300 -	.3600
Neophax*	lb.	.1570 -	.2680
Polyrez A and C*	lb.	.12 -	.17
White*	lb.	.1480 -	.2520

Miscellaneous Rubber Substitutes

G.B. Asphaltenes*	lb.	.06 -	.06½
Gilsowax B*	lb.	.09 -	.11
Resin No. 1098 (dms.)	lb.	—— -	.62
No. 1198*	lb.	.46¼ -	.49¾
Tysonite*	lb.	.24 -	.24¾

SOLVENTS

Acetone (dlvd.)	lb.	.07 -	.10
Amsco Lactol Spirits* (t.c.)	gal.	—— -	.19
Naphthol Spirits*	gal.	—— -	.18
Mineral Spirits*	gal.	—— -	.17
Rubber Solvent* (t.c.)	gal.	—— -	.18
Solv A* (t.c.)	gal.	—— -	.24½
Solv A-80* (t.c.)	gal.	—— -	.30
Solv B* (t.c.)	gal.	—— -	.29½
Solv B-90* (t.c.)	gal.	—— -	.32
Solv D* (t.c.)	gal.	—— -	.30
Solv E*	gal.	—— -	.30
Solv F*	gal.	—— -	.30
Solv F-80*	gal.	—— -	.32½
Solv G*	gal.	—— -	.42½
Special Naphtholite* (t.c.)	gal.	—— -	.18
Special Textile Spirits*	gal.	—— -	.19
Super Hi-Flash Naphtha*	gal.	—— -	.45
Super Naphtholite*	gal.	—— -	.18
Textile Spirits* (t.c.)	gal.	—— -	.19
Amyl Chlorides, Mixed (l.c.l.) (dms.)	lb.	.09¼ -	.10¼
Benzol 90%	gal.	.36 -	.40
Butyl Acetate (t.c.)	lb.	.15 -	.16
Butyl Alcohol (t.c.)	lb.	.15 -	.16
Secondary (dlvd.)	lb.	.11½ -	.14½
Tertiary (dlvd.)	lb.	.12 -	.15
Carbon Bisulfide, Tech.	lb.	.05½ -	.07½
Carbon Tetrachloride	lb.	.09½ -	.12¾
Cosol 1*	gal.	.37 -	.43
2*	gal.	.42 -	.48
Cyclohexane	gal.	.55 -	.72
85% (c.l.) (dms.)	gal.	—— -	.54
Cyclohexanone	lb.	.32 -	.35
Diacetone, Pure (dlvd.)	lb.	.12 -	.15
Dichlorethyl Ether (dms.)	lb.	.14½ -	.15
Formal (dms.)	lb.	.30¾ -	.31¼
Dichloropentane	lb.	.04¼ -	.14¼
Dicom*	gal.	.30 -	.42
Halowax Oil*	lb.	.28 -	.41
Heptanes* (t.c.)	gal.	.17 -	.22
Hexanes (t.c.)	gal.	.17 -	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.41 -	.61
Ether, Ref. (dlvd.)	lb.	.05 -	.08
Mersol*	gal.	.43 -	.79
Mesityl Oxide (dlvd.)	lb.	.11½ -	.14½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.57 -	.63
Methyl Chloride	lb.	—— -	.11½
Methyl Ethyl Ketone	lb.	.11½ -	.14½
Methyl Isobutyl Ketone (dlvd.)	lb.	.13½ -	.16½
Methylene Chloride	lb.	.11¼ -	.15
N-5 Pentane Mix* (t.c.)	gal.	—— -	.13½
N-6 Hexanes* (t.c.)	gal.	—— -	.14½
N-7 Hexanes* (t.c.)	gal.	—— -	.13½
Penetrell*	gal.	.40 -	.62
Perchlorethylene	lb.	—— -	.14
Petrolene* (t.c.)	gal.	—— -	.14125
Picolines, Alpha, Refined	lb.	.43½ -	.44
Mixed	lb.	—— -	.35
Proprietary Solvent (dms.)	gal.	.51 -	.72
Propyl Acetate (t.c., dlvd.)	lb.	—— -	.10¾
Alcohol (t.c., dlvd.)	lb.	—— -	.10
PT 150 Pine Solvent* (dms.)	gal.	—— -	.44
Pyridine, Refined	lb.	—— -	.75
Quinoline	lb.	.50 -	1.35
Rubber Solvent (t.c.)	gal.	—— -	.16
Rubsol (t.c.)	gal.	—— -	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	—— -	.158
C (Heptanes)* (t.c.)	gal.	—— -	.151
R (Rubber Solvent)*	gal.	—— -	1.29
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100* (t.c.)	gal.	.33 -	.37
150 (t.c.)	gal.	.33 -	.37
Sunny South DD Dipentine*	gal.	.40 -	.62
Sunny South DD Pine Oil*	lb.	.12¼ -	.14¾

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good workmanship

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MAGNESIUM STEARATES ALUMINUM STEARATES

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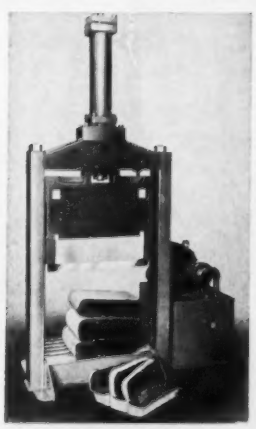

A moderately priced machine, simple in design and economical in operation, that fully meets all requirements. Hydraulically operated and completely self - contained. The heavy - duty knife will cut a full 29-inch width (opening is 23 inches high). Bales can be cut to minimum 1-inch slabs. Bales are easily advanced for cutting as they rest on ball-bearing rollers. Only one operator is required and built-in controls provide safe operation.

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SPADONE MACHINE CO. INC.
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SOLVENTS (Cont'd)

Sunray*	gal.	.1140	.1600
Toluene (dms.)	gal.	—	.38
Toluol (t.c.)	gal.	—	.34
Trichlorethane	lb.	.13	.13½
Triglycol Dichloride	lb.	.63	.64
Union Thinner 1* (t.c.)	gal.	—	.172
5* (dms.)	gal.	—	.197
7* (t.c.)	gal.	—	.162
2-50 W Hi-Flash*	gal.	—	.41
Xylol	gal.	.34	.38

STABILIZING AGENTS (for Vinyl) Resins)

Advastab No. 21*	lb.	1.00	1.08
50-LT*	lb.	3.20	3.35
BC-105*	lb.	.75	.80
E-6-B*	lb.	.80	.85
L Paste	lb.	.65	.70
X23-74*	lb.	.70	.80
X30-15*	lb.	.65	.75
XE-82*	lb.	.85	.95
Barca 10*	lb.	.75	.80
Barium Ricinoleate (BVS)	lb.	—	.70
Barium Stearate	lb.	.39	.44
Basic Silicate White Lead	lb.	.20¾	.21¾
Cadmium Ricinoleate	lb.	—	2.00
Calcium Ricinoleate	lb.	—	.55
Dutch Boy DS-207*	lb.	—	.54
Plumb-O-Sil A*	lb.	—	.29¾
B*	lb.	—	.31¼
Tribase*	lb.	—	.26½
Dythal*	lb.	—	.39½
Ferro 182* (dms.)	lb.	.70	.76
200* (dms.)	lb.	1.33	1.43
203* (dms.)	lb.	.85	.95
541* (dms.)	lb.	.35½	.45½
541A* (dms.)	lb.	.81¾	.91¾
700* (dms.)	lb.	.48¾	.58¾
900* (dms.)	lb.	.90	1.00
903* (dms.)	lb.	.55	.65
909* (dms.)	lb.	.91	1.01
920*	lb.	—	.98
931* (dms.)	lb.	.75¾	.85¾
993* (dms.)	lb.	.89	.99
1203* (dms.)	lb.	1.30	1.40
1206* (dms.)	lb.	1.23	1.33
1820* (dms.)	lb.	.90	1.00
1825* (dms.)	lb.	.45	.55
Harshaw 1-V-3*	lb.	—	.43
1-V-4*	lb.	—	.68
1-V-7*	lb.	—	.66
2-V-4*	lb.	—	.85
2-V-7*	lb.	—	1.10
2-V-8*	lb.	—	1.30
5-V-1*	lb.	—	.41
7-V-1*	lb.	—	.90
8-V-1*	lb.	—	1.10
8-V-5*	lb.	—	.80
8-V-100*	lb.	—	.84
9-V-1*	lb.	—	.76
12-V-5*	lb.	—	.75
24-V-1*	lb.	—	1.28
28-V-2*	lb.	—	1.18
128-V-5*	lb.	—	.86
Lithium Stearate	lb.	.57	.62
Fluffy	lb.	.47½	.70
Standard	lb.	.52½	.75
Metasap 613-A*	lb.	—	.69
613-B*	lb.	—	.84
613-C*	lb.	—	1.06
621*	lb.	—	.88
624*	lb.	—	.75
633*	lb.	—	.75
635*	lb.	—	.45
Modicol N*	lb.	.41½	.42½
S*	lb.	.30⅜	.31⅜
Permyl A	lb.	.45	.55
Sodium Silicates 41°/1:32	cwt.	1.00	2.10
Stabelan E*	lb.	1.35	1.50
XL*	lb.	.55	.65
HR-50*	lb.	.75	.90
HR Liquid*	lb.	.65	.75
HR Paste*	lb.	.85	.95
HR Powder*	lb.	.95	1.05
No. 110 Liquid	lb.	.65	.75
No. 115 Liquid	lb.	.85	.95
No. 120 Liquid	lb.	.65	.75
Stabilizer No. 3*	lb.	1.90	2.00
No. 42*	lb.	.83	.93
No. 52*	lb.	1.90	2.00
No. 89X*	lb.	.75	.80
No. 143*	lb.	.80	.90
BC-12*	lb.	.87	.95
B-5*	lb.	—	.70
CH-14*	lb.	—	.65
CH-20*	lb.	—	.65
E6B*	lb.	—	.95
E-49*	lb.	—	.60
E-98*	lb.	—	.55
G-1*	lb.	1.25	1.40
HR*	lb.	.85	.89
JCX*	lb.	—	.63
L*	lb.	—	.60
OM-10*	lb.	—	1.95
OM-18*	lb.	—	3.25
SN*	lb.	—	.48
V-1-N*	lb.	—	.43
VL-3*	lb.	—	1.00
Staflex OY*	lb.	1.00	1.20
QXMA*	lb.	—	.70
Stayrite 10*	lb.	.32	.37
P-10*	lb.	.39	.44
15*	lb.	.53	.58
20*	lb.	.37	.42
22*	lb.	1.30	1.34

STABILIZING AGENTS (Cont'd)

Stayrite 25*	lb.	.35	.40
70*	lb.	.68	.70
71*	lb.	.88	.90
75*	lb.	.68	.70
76*	lb.	.58	.60
80*	lb.	.68	.70
90*	lb.	.68	.70
95*	lb.	.68	.70
229*	lb.	.45	.50
Vanstay L*	lb.	.33	.35
H.T.*	lb.	.90	.92
S*	lb.	.63	.65

STIFFENING AGENTS

Neozone*	lb.	—	.80
Polyac*	lb.	—	1.80
Processing Stiffener 710*	lb.	—	.88
Solvitose HDF, H. C-S, T, and E*	lb.	.22	.25
Versatil Gum 8-E*	lb.	.15	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23	.24
AA-1177*	lb.	.15½	.16½
Antisol*	lb.	—	.23
Antisun* (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone*	lb.	.30	.31
Microflake*	lb.	.20	.24
NBC*	lb.	—	1.55
Ross Sunproofing Waxes*	lb.	—	.14
Sunolite*	lb.	.16	.22
127*	lb.	.16½	.20½
154*	lb.	.23	.25
Sunproof*	lb.	.31	.32
713*	lb.	.25	.26
Improved*	lb.	.25	.26
Super*	lb.	.40	.41
Jr.*	lb.	.20	.21
Tonox*	lb.	.52	.54

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56	.59
Anhydrol 6990*	lb.	.51	.56
6991*	lb.	.51	.56
Aquarex D*	lb.	—	.78
G*	lb.	—	.21
MDL*	lb.	—	.33
ME*	lb.	—	.80
NS*	lb.	—	.60
SMO*	lb.	—	.50
WAQ*	lb.	—	.22
Emulphor EL-620*	lb.	—	.40
EL-719*	lb.	—	.058
EL-870*	lb.	—	.055
Igepal CA-630	lb.	—	.29
CO-630	lb.	—	.29
CO-730	lb.	—	.29
CO-850*	lb.	—	.29
CO-880*	lb.	—	.29
Igepon CN-42*	lb.	—	.25
T-33*	lb.	—	.31
T-51*	lb.	—	.31½
T-77*	lb.	—	.49
Kessco 50201*	lb.	—	.43½
50203*	lb.	—	.44
18201*	lb.	—	.38
18203*	lb.	—	.35¼
Pluronic L62*	lb.	.33½	.39
L64*	lb.	.33½	.39
Sellogen Gel*	lb.	—	.12¾
Soybean Lecithin	lb.	.13	.17

TACKIFIERS

Amalgamator Z-4*	lb.	.32	.33
Arcco 620-32B*	lb.	.20½	.21
716-30*	lb.	.18½	.19
1041-21*	lb.	.16½	.17
Bunaweld Polymer No. 780*	lb.	—	.24
No. 5514*	lb.	—	.35
Galex* (dms.)	lb.	.15¾	.18
Indopol H-300*	gal.	1.00	1.22
Koresin*	lb.	—	.95
Liquid Rubber Flux*	lb.	—	.14
Nacconal NRSF* (dlvd.)	lb.	.40½	.45
Nilox* (c.l.)	cwt.	—	14.50
Resin V	lb.	—	.23½
Synthol*	lb.	—	.24¾
Tackifier 1041-21*	lb.	.16½	.17½
Vistac No. 1*	gal	1.00	1.21
A*	lb.	.21½	.22¼
Zirex* (c.l.)	cwt.	—	14.75

THICKENERS (For Latex)

Alcogum AN-6*	lb.	—	.05
AN-10*	lb.	—	.08½
Betanol* (dms.)	lb.	.70	.95
Gomme Labolene*	lb.	.45	.47
Good-rite K-702*	lb.	.34½	.35
K-704*	lb.	.21	.22
K-705*	lb.	.31	.32
K-707*	lb.	.18	.19
K-708*	lb.	.29	.30
K-710*	lb.	.15	.16
Modicol VD*	lb.	.13⅜	.14⅜
VE*	lb.	.13⅜	.14⅜
Polyco 296 BT*	lb.	.15	.16
296-N*	lb.	.15	.16
530*	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.00	2.10
Solvitose Series*	lb.	.22	.25

VULCANIZING AGENTS

Selenium

Vandex*	lb.	—	15.50

Sulfur

Aero Brand*	cwt.	—	2.40
Blackbird* (c.l.)	cwt.	—	2.85
Cloud* (c.l.)	cwt.	—	2.80
Crystex*	lb.	.19½	.23
Darex Dispersed Sulfur*	lb.	.14	.16
Devil A* (c.l.)	cwt.	—	2.40
Dispersed Sulfur	lb.	.14	.16
Insoluble Sulfur 60*	lb.	.12½	.13
Ko-Blend IS*	lb.	—	.39
Mist* (Wettable) (c.l.)	cwt.	—	4.00
Spider* (c.l.)	cwt.	—	2.80
Star* (c.l.)	cwt.	—	3.25
Sulfasan R*	lb.	—	1.50
Tire* (c.l.)	cwt.	—	2.40
Tube* (c.l.)	cwt.	—	3.25
Vultac 2*	lb.	.47	.49
3*	lb.	.51	.53

Tellurium

Telloy*	lb.	—	2.50

WETTING AGENTS

Advawet No. 10*	lb.	—	.20
No. 33*	lb.	—	.48
Aerosol 18*	lb.	—	.40
AY*	lb.	1.00	1.20
MA 80%*	lb.	.67	.72
OS*	lb.	.39	.45
OT 75% Aqueous*	lb.	.63	.68
OT 100%*	lb.	1.00	1.20
OT-B*	lb.	.85	1.05
Alrosal* (dms.)	lb.	—	.40
Alrosperse*	lb.	—	.18
Anhydrol 6990*	lb.	.51	.56
6991*	lb.	.51	.56
Areskap 50*	lb.	.30	.38
Dry 100*	lb.	.60	.72
Aresket Dry 300*	lb.	.60	.72
Aresklene 375*	lb.	.42	.57
Armacs*	lb.	.28	.77
Arquads*	lb.	.24	.60
Emcol 5100* (dms.)	lb.	—	.30
5130* (dms.)	lb.	—	.30
Etho-Chemicals*	lb.	.26	.58
Kesco E-122* (dms)	lb.	—	.45
18201*	lb.	—	.38
Krelson 8G* (dms.)	lb.	.26	.32
Kyro EO* (dms.)	lb.	—	.29½
Modicol N*	lb.	.41½	.42½
S*	lb.	.30⅜	.31⅜
Nacconol SL* (dlvd.)	lb.	.084	.10
60S* (dlvd.)	lb.	.19	.225
Naccosol A* (dlvd.)	lb.	—	.52
Orvus AB Granules*	lb.	.15¾	.16¾
Parnol*	lb.	.13	.18
Santomerse D*	lb.	.44	.65
S*	lb.	.13	.25
Selapon Gel*	lb.	—	.13
Sorapon SF-73*	lb.	—	.18
SF-78*	lb.	—	.30
Sorbit P*	lb.	—	.28
Soybean Lecithin	lb.	.13	.17
Stablex G*	lb.	.50	.90
Tergitol 4* (dms., dlvd.)	lb.	.32	.33
7* (dms., dlvd.)	lb.	.43	.44
O8* (dms., dlvd.)	lb.	.31	.32
P28* (dms., dlvd.)	lb.	.18½	.19
Trenamine W-30	lb.	—	.15
Vultamol*	lb.	—	.17½
Wetsit Conc.*	lb.	.25	.28

MISCELLANEOUS CHEMICALS

Aquesperse 30*	lb.	—	.11
Arcopel W-18*	lb.	.17	.19
Asbury Graphite*	lb.	.05	1.45
Copper Inhibitor X-872-L*	lb.	—	2.01
D-Tac*	lb.	—	.22
2-Ethyl Hexanol	lb.	.23¾	.24¾
Fura-Tone Resin 1226*	lb.	.41	.43
HB-20*	lb.	.15	.17
HB-40*	lb.	.19	.22
MODX*	lb.	.32½	.34½
BF*-13	lb.	—	.26½
Nacconate 65* (dms.)	lb.	1.20	1.23
80* (dms.)	lb.	1.20	1.23
100* (dms.)	lb.	1.30	1.33
200* (dms.)	lb.	2.00	2.03
300* (dms.)	lb.	3.50	3.53
Para Resin 2457*	lb.	.04	.04½
2702*	lb.	.04	.04½
2718*	lb.	.04	.04½
Pigmented Filmite* (dlvd.)	lb.	—	.16¾
Resorcin, Tech.	lb.	.77½	.78½
Rio Resin*	lb.	.60	.62
Rongalite CX*	lb.	—	.21½
Sherosope F*	lb.	.15½	.17¾
F-455*	lb.	.13½	.15¾
L*	lb.	.14	.16¼
N*	lb.	.15	.17¼
T*	lb.	.16½	.18¾
Sublac Resin PX-5*	lb.	.23½	.24½
Sulfasan R*	lb.	—	1.50
Synpep*	lb.	.54	.60
Thiokol LP-2*	lb.	.96	1.06
LP-3, LP-32, LP-33*	lb.	.96	1.06
LP-8*	lb.	1.25	1.35
Tysonite*	lb.	.24	.24¾
VA-7*	lb.	.50	.60
Vanfre*	gal.	2.50	3.00

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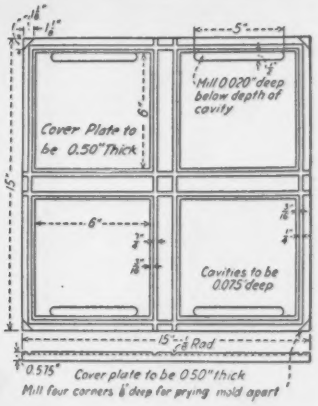
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0.515"
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SALES ENGINEER (Rubber Technologist) interested in position as technical representative chemicals, rubber, adhesives. Boston base. Have fifteen years experience selling industrial adhesives New England. Address Box 583-P, RUBBER AGE.

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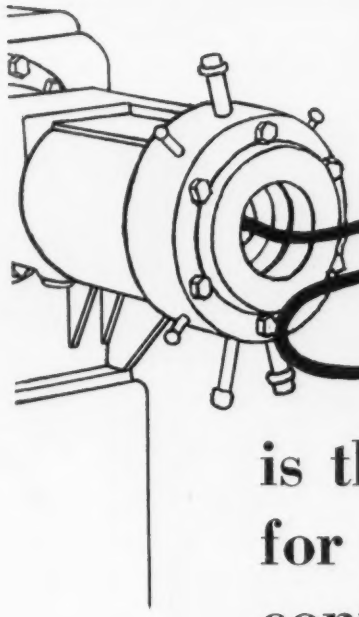

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